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### WINTER MOORING AT BUFFALO.

Buffalo, Dec. 23.—“Yes, we are laying up the lake fleet as fast as we can and doing the best we can by everything, but it is very much like trying to do a department-store business at a peanut stand”.

This doleful and no doubt intentionally exaggerated statement was made a day or two ago by a leading vessel broker. All he meant was to state with all possible force that the port of Buffalo was undertaking a very hard job and that it was bound to carry the job through, for there is no getting out of it. The usual late fall fleet is here and it must be taken care of, just as the tramp lodger is when he applies at the police station.

This is not saying that the winter fleet is not welcome. Far from that. The only regret is that there is no longer the room for the tonnage that there should be, so that when the last boat is finally tied up there will be craft more than a mile up Buffalo river, craft a mile and a half up the Blackwell Ship canal, craft at the steel plant four miles above the mouth of Buffalo river, craft some miles down the Niagara, not to mention the overflow to Tonawanda of about all the craft small enough to get down there.

To begin with there is a matter of a little over three miles of grain and flaxseed to winter afloat, something never approached in amount before. Often there is not a million bushels, and even now, with not a bit of corn offered in this way, there must have been some very unusual influences to bring so much here to remain through the winter. For the elevators are all full besides, at rates that are somewhat higher than they have been before, a few steel houses getting 2 cents a bushel for holding to any time up to April 15th.

Had there been corn offering in proportion to the crop there would have been much more than could possibly have been taken care of, but the new corn crop is hardly dry enough to handle in that way, besides the special export all-rail rate on corn is taking it to the seaboard so fast that the lakes have been robbed of their dues ever since the crop was ready to move. So we shall have to be content with wheat mostly. As accounted for now there is something over 5,000,000 bushels of it afloat to hold through the winter, or as much of the winter as the shipper desires, about 2,500,000 bushels of flaxseed and 430,000 bushels of rye, oats and barley. This ought to mean plenty of care-taking through the winter, including much effort to keep the harbor open to movement of vessels, especially fire tugs.

The new situation in the harbor, revealed by the want of dock room, is one not to be lost by the careful marine man. Though it may not happen again that such a grain fleet is driven in here at the end of the season, for the close of the season, supposing it to have been practically last week, found over 5,000,000 bushels waiting to unload, still it is quite possible and so it would be well to do all that can be done to make a place for the fleet. It is not likely that the inner harbor can ever be enlarged very much as it is by any sort of foresight or outlay, though the operations above the turnpike bridge, with its elevator, iron works and million-dollar malting plant may be the beginning of opening Buffalo river up a mile or two further, but that is still a problem.

The completion just now of the Pennsylvania ore and coal dock on the city side of the steel plant calls attention to the ship canal lately finished there, with the Buffalo & Susquehanna iron furnaces on the opposite side of it. There will need to be a good many vessels laid up in that harbor, though it is far from the city and is not easily reached by land except by private conveyance. So the vessel owner will be interested in the work on the new ship canal leading down the Niagara from the mouth of Buffalo river, on which work will begin soon and which will open the Niagara several miles to deep-draught vessels.

Odd that the car shortage has had a sort of contradictory effect on the business of Buffalo harbor. At first it shut off business and increased the all-rail movement, for a car once secured was made to keep going. Then there was a further giving out of cars, especially through Canada, and there was nothing to do with Lake Superior grain but to send it here to lay up or leave it a thousand miles further inland, subject to winter all-rail rates. So it came here.

The harbor is now filling up also with hard coal, loaded since the coal shipping season closed. The Lackawanna Company is rebuilding its coal-storage plant east of the city and so is short of room. It had considerable of a certain size on hand and has taken six vessels to put it into, paying 15 cents over spring rates. It is possible that quite an addition to the 35,000 tons or so already taken will be taken also. Heaven forbid that there should be any serious fires in the harbor this winter. The city has a charge to keep such as it has not had before.

JOHN CHAMBERLIN.



## MECHANICAL LIFT LOCKS IN AMERICA.\*

Before New York state finally committed itself to the enlargement of its canals, a survey with plans and estimates of the cost of the work was required. In the making of these plans and estimates a great deal of consideration was given to the subject of high mechanical lift locks, particularly at two places on the Erie Canal, Lockport, and Cohoes.

At Lockport there is an abrupt change of elevation in the present Erie Canal of 56 ft. which is overcome by a double flight of five locks. The proposition considered here for the enlarged canal was to substitute a single mechanical lift lock for the present ten locks.

On the existing canal at Cohoes there are 16 locks to overcome the difference of level between the Hudson and the Mohawk above Cohoes Falls. These locks, known as "The Sixteens," are quite near together, but are separated by lengths of canal forming basins. Here it was proposed to make a change of location and put in a single lift lock with a lift of 112 to 121 ft., the variation depending on the height of the dam to be built above the Cohoes Falls.

It was claimed by the advocates of mechanical lift locks at both these places that they would be cheaper to build and to operate than locks of the ordinary type, that it would take less time for the passage of boats and would require very much less water. As water for power at both points is valuable for manufacturing purposes this latter claim was important.

So important was the subject of locks at these two places that the State Engineer of New York, at that time Mr. E. A. Bond, appointed a special board of engineers to consider it. The writer was a member of the board. This board directed its attention particularly to the lift at Cohoes because at this point there is the greatest and most abrupt change of level in the whole line of canal and therefore the most favorable site for using a mechanical lift lock. At the time that the board met the change of level proposed for the lift was 112 ft. The locks prescribed for the improved canals were, in the clear, 310 ft. long, 28 ft. wide and with 12 ft. depth of water.

To accomplish the required lift of 112 ft. with a single structure three kinds of mechanical locks were suggested. The central principle of them all consisted in the counterbalancing one against the other of two tanks of the size above given for locks, each tank capable of containing and floating two boats of 1,000 tons freight capacity, with auxiliary devices to control their vertical motions through the prescribed amplitude of the lift.

Besides this primary function of vertical movement in unison between the two levels, the three kinds of lifts each provided devices and apparatus for closing and opening communication between the tanks and the upper and lower levels, for keeping the tanks constantly horizontal and for bringing them to rest without shock. Although each typical plan presented its own details for these appliances, the closing and connecting details in the nature of gates and gaskets did not in any way belong necessarily to the type, but any one of them could be applied to any type of lift lock.

The three types differed essentially in the medium through which the balancing was effected; in the first type the medium was air; in the second it was a set of cables; in the third it was water.

The air type examined was the Dutton pneumatic lift lock. In this design the counterbalance is effected by columns of compressed air confined in air chambers un-

der each tank, inter-communicating at the bottom through air supply pipes which also communicate with an air accumulator and compressor. Each tank is supported on an inverted caisson which rises and falls in a fixed pool of water, which water seals the air in the caisson. These air chambers support the lock tanks by their buoyancy and displace a volume of water equal to their own weight together with that of the loaded tank, and to insure the water seal, they must be made so high that the bottom edge will remain submerged in the water of the lower pool to a depth greater than their displacement when the lock tank which they support and to which they are attached is raised to communicate with the upper level; this requires pits of a corresponding depth in the lower pool. As designed by the inventor, the air chambers and tanks have approximately the same horizontal area; giving for locks of the enlarged canal a vertical displacement of about 20 ft. and requiring pits about 140 ft. deep, for a lock of 112 ft. lift. These pits would have to be excavated about 325 ft. long and 35 ft. wide, and kept free for the up and down movement of the tanks.

In the second type of lock examined by the Board the companion lock tanks were held in counterbalance by wire or chain cables passing over wheels or drums supported on steel towers. Mr. W. R. Davis submitted a carefully worked out plan and estimate for this type covering the Cohoes site.

Neither of these two types of locks, the pneumatic and the chain balancing, had reached the experimental stage, being simply preliminary studies on paper and the Board stated that though their design bore evidence of careful study, great labor, and the exercise of trained intelligence and ingenuity and indicated entire feasibility, it would hesitate to recommend a mechanical contrivance of this magnitude involving the harmonious working of so many functions, until its workable value had been ascertained by experiment and practical trial on a large scale. This the Board considered especially true of the pneumatic lock whose many novel devices required practical tests to determine their proper proportions and modes and rate of operation.

The comparative cost of constructing and installing locks of these two types at the Cohoes site appeared by the quantitative estimates submitted by their designers to be somewhat greater for the superstructure of the tower and cable lock, than for the superstructure of one of the pneumatic type, but the cost for the excavations and masonry for the latter would be very large, making the total probable cost considerably greater than for a lock of the former kind.

In the third or hydraulic type of lift lock for which sketch plans were submitted by Mr. T. E. Brown, Jr., chief engineer of the Otis Elevator Co., and consulting engineer for the Buffalo Engineering Co., the counterbalancing of the companion lock tanks was effected by columns of water contained in suitable hydraulic cylinders symmetrically disposed under the longitudinal axis of each tank, intercommunicating at their lower ends, which must be sunk deep enough below the surface of the lower level to provide the desired lift. Mr. Brown proposed to use three cylinders under each tank and to co-ordinate their movement by a heavy central counterweight directly connected with both ends of the tank by a detail under which the weight always acts to overcome any irregular distribution of load caused by the tendency of the water to flow to whichever end of the tank might be temporarily depressed below the other end.

As stated by the Board the hydraulic type has the merit of having passed the experimental stage, as a considerable number of lift locks based on this principle have been constructed and are in operation. Each tank, has, how-

\*Extracts from a paper submitted to the Tenth International Navigation Congress by Lieut.-Col. Thomas W. Symons, Corps of Engineers, U. S. A.

ever, generally been carried on a single hydraulic cylinder. It was felt that a single cylinder would not be sufficient for the long tanks of the canal proposed, 310 feet in the clear.

The Board expressed the belief that the synchronous movement of the opposite ends of the lock tanks carried on several cylinders could be secured satisfactorily by the method suggested by Mr. Brown in general accord with the model which he submitted. In addition to the fact that the hydraulic type of lock has been successfully tried, it is cheaper to install than the pneumatic lock on account of the far less volume of excavation and masonry involved in its construction and is probably cheaper than any other kind of mechanical lift lock.

It was considered that in relative merit the different types of mechanical lift locks stood as follows: 1, the hydraulic lock; 2, the chain balance lock; 3, the pneumatic lock.

Consideration was also given by the Board to the applicability of a double flight of four masonry locks of the ordinary type to overcome the fall, each lock having a lift of 28 ft.

After carefully studying the matter and giving due weight to questions of first cost, and cost of operation and maintenance, to time of passage by the fleets of boats which will probably use the canal, the water supply and usage of water, and liability to serious accidents and delays, the Board recommended that masonry locks of the ordinary type be adopted.

This recommendation was largely based on the fact that the water supply is ample for the ordinary locks and the state has the first right to it for purposes of navigation, and because the mechanical lift lock is a metallic machine subject to the wear, depreciation and necessary renewals which always make a large annual charge against every such machine. Its successful operation involves a great number of appliances all requiring power and attendance. In the masonry locks these features are confined to the gates and valves with the appliances for moving them. There can be no doubt that the masonry locks would be more cheaply maintained and operated and suffer less depreciation, and that they would afford greater immunity from serious accidents than any lock of the mechanical type in which an accident may prove a disaster, possibly a disaster which would prevent the use of the canal for an entire season of navigation.

Since the report of the Board a new route has been found and decided upon for the chain of masonry locks which gives a basin at the head of each lock ample in size to permit the lockage water to be used without materially lowering the water in the basin, thus permitting the use of single locks instead of a double flight of locks, costing much more.

The Board having exhaustively considered the subject of lift locks at Cohoes where there is the greatest change of level, stated that at no other points were there as good reasons for adopting mechanical lift locks as at Cohoes and that masonry locks should be adopted throughout the entire canal system. The economy of masonry locks as compared with mechanical ones of any type increases as the height of the lift to be overcome decreases for the reason that a large part of the cost of locks of the latter type is for structures, apparatus and machinery that must be the same whatever the amplitude of their lift may be.

In accordance with the report of the Board, masonry locks have been adopted exclusively for the new Erie, Oswego and Champlain canals under improvement by New York.

A rather remarkable lock has been proposed for the Erie Canal at Lockport which is receiving consideration. At this place under the adopted plans for the new canal

there will be a fall of 50 ft. and the original plans called for a double tier of two locks each with 25 ft. lift. The new proposition is to use instead a single masonry lock of 50 ft. lift with the regular horizontal dimensions of all other locks. The upper gates for this lock would be the same as for ordinary locks, but the lower gates would be entirely different. The head room under the fixed bridges of the canals will be 16 ft.; therefore the movable part of the lower gate need only be in height 16 ft. plus the depth of the canal, 12 ft., or 28 ft. in all. The upper 34 ft. at the lower end of the lock chamber may be fixed in position of steel or masonry. The gate proposed is a vertical lift gate which can be operated from the top of the fixed wall at the lower end of the lock chamber. When in position the gate would be very nearly square and supported on top and bottom and both sides. This lock will cost much less to install than the four locks originally proposed, but it has certain objections in the additional amount of water required for the passage of boats, the time required for lockage, and the difficulty of providing middle gates which render its adoption uncertain.

### BOOK REVIEWS.

"Practical Planer Kinks," by Carroll Ashley, New York. Hill Publishing Co. 80 pages. 32 illustrations. 5x7½ in. Cloth. Supplied by the *Marine Review* at \$1.00.

This book is intended for the use of planer hands, and starts out by describing the machine. A full page illustration of the machine is given, the various parts being clearly shown together with their names. A short chapter is devoted to the planer hand or operator, and then the equipment of the planer is taken up. The various tools which are used on the machine are illustrated and described together with a number of special tools which come in useful. Devices for fastening the work to the table and methods of holding down intricate pieces are well illustrated. The various adjustments that can be made on the machine are discussed and the methods of planing various classes of work are also discussed. This includes planing cored work, planing all over, grinding on the planer and other operations. Attachments for circular planing, for slotting, for the planing of tool block fixtures and for cutting spiral grooves on the machine are also illustrated. The book is a valuable one and should be in the possession of every machine shop foreman and planer hand.

The first meeting of the executive board of the recently organized Motor Boat Club of America was held recently at the office of the commodore, A. D. Proctor Smith, Broadway and 56th St., New York. The first thing that the club will do will be to select a site for a club building. Following are the officers: A. D. Proctor Smith, commodore; Frederick Sterry, vice commodore; George Gillig, rear commodore; Hugh S. Gambel, secretary; Charles Francis, treasurer; Edward R. Thomas, Howard Gould, Jacob Sigel, H. H. Behse, John J. Amory, and George J. Vestner, board of governors.

Mr. W. S. Howard, Yonkers, N. Y., who recently had charge of the motor department of the Gas Engine & Power Co., and Charles L. Seabury & Co., Cons., Morris Heights, N. Y., will enter the marine field with a line of high grade four cycle motors.

The contract for the steam yacht designed by Wm. Gardner for Andrew M. Rose of the New York Yacht Club, has been let to the Pusey & Jones Co., Wilmington, Del. The new vessel will be built of steel 160 ft. over all, 130 ft. on the water line, 21 ft. breadth and 9 ft. draught.

## UPBUILDING OF OUR MERCHANT MARINE.

BY F. W. HIBBS.

Whatever may be the causes of the decline of the foreign shipping business of this country, and whatever may be the significance or the bearing thereof, it must be acknowledged that that fact exists; that the flag of the United States is fast disappearing from the high seas; and that, judging from present conditions and tendencies, it will not be long before the American merchant marine will have nothing to identify it but its past greatness.

To those who have had any opportunity to observe these conditions this fact has been glaringly evident; and to others it is only necessary to study the statistics that have been published from time to time to be convinced not only of its existence, but of the impending doom of this once flourishing industry.

This condition has not been reached without the warning of thinking men all over the country; the trend of the foreign shipping business has been made known over and over again for several years; and repeated attempts have been made to bring the state of affairs to the attention of Congress with a view of securing legislative action that would result in gradually upbuilding the merchant marine.

Although so far unsuccessful, the agitation of this question has served to bring it before the people; and it is believed that a thorough appreciation of the condition to be met cannot fail to bring about adequate measures of relief.

We are told that years ago there was an American merchant marine of which any nation might be proud; more than that, that it was the greatest commercial fleet in the world; yet it takes all the faith of which most of those who have watched it for the past twenty years are capable to believe that statement; and there are those, principally foreigners, who try to say that the Americans are not a maritime nation, and who use that argument as an explanation of the decline of interest in American shipping.

It is an axiom in business that an enterprise that does not attract capital is a poor investment; no amount of argument on earth could demonstrate otherwise; and in spite of all the theory that can be advanced there remains the fact that capital is being withdrawn from American shipping, with the inevitable conclusion that it does not pay.

Conversely, if it were a paying investment, the most adverse circumstances and the greatest difficulties could not prevent the attraction of capital in its direction. It is not the difficulties to be overcome that determine men in attempting a venture; it is the probability of success and the reward.

Once make the shipping business worth while, and there is no question whatever as to its fate. Herein lies the explanation of the decline of American shipping; it is not because the Americans are not a maritime nation, but because they are not enabled to compete with the foreigners in the carrying trade of the world, and are compelled to withdraw from the business.

It is calculated to humble an American's pride when he visits a large foreign port, teeming with vessels of all sizes and flying the flags of all nations, to see not one with the stars and stripes flying at her mast-head; and it is poor consolation to think that the reason for all this is not because this country has no foreign commerce, but because the foreigner has run the American out of business.

If any American can go abroad and see these things without deprecating them; if he can come home and ignore their significance, he has no pride of this country. In most men, they would stir up a feeling that any means would be warranted in placing the American flag again upon the high seas.

The United States is a maritime nation; the Americans are adapted to maritime pursuits, as much as any nation on earth; and there is no reason why they should not at least carry their own commerce, if not that of other nations.

It is weakness to point to the difficulty or to the expense of building up a merchant marine; and it is poor logic to attempt to prove that the re-establishment of this industry would not benefit all parts of the country.

It is an exception where an undertaking begins to pay from the startout; in most cases money has to be put into a project for some time before it begins to pay; but the man who lacked the nerve to follow up this belief in an undertaking for this reason would deserve no returns.

If effective means be taken to build up the American merchant marine, no one with any foresight and understanding can fail to see the ultimate benefit to every branch of industry and every port of the country.

A few years ago the United States had no navy. It had been allowed to dwindle away until it was ridiculous as to its numbers and as to the character of its ships; nothing but its former greatness remained. The average American could see no advantage of having a navy and particularly to expending any money for one. It could not possibly benefit any part of the country except the sea coast, and if worse came to worst, a gun on a raft manned by American seamen could whip the world.

After the greatest possible effort, Congress was induced to begin the re-building of the navy; it was good fortune rather than good management that placed this nation in a position to meet the emergencies of war. By that time, there was a navy that answered the purpose; it would have been far different otherwise.

The achievements of the navy during the war with Spain brought it to the appreciation of the nation and it is to be hoped that its utility, demonstrated by the example, will be of lasting endurance.

But aside from that consideration is the practical one that the upbuilding of the navy virtually started the steel ship building industry of the United States.

The very existence of some of the American ship yards has been due to the encouragement offered by this Government work.

Who can say that this alone has not reacted to the advantage of the people?

The building of a ship involves practically every trade and nearly all of the materials and manufactures in existence. The work employs great numbers of mechanics of the highest skill and draws its materials from all parts of the country. How far reaching its influence is cannot be appreciated by those not familiar with its character; but it may be stated that there is no industry in existence which reaches a greater number of people and distributes its business more widely than that of ship building.

Practically all of the large ship building now being done in this country is on Government vessels. In fact, it is questionable whether any of the large yards now in operation could continue, certainly not at their present magnitude, if it were not for the liberal policy of the Government in building naval vessels; and the sudden cessation of that policy could not be regarded otherwise as a calamity to the country.

It requires large and very expensive plants to build war-vessels, and if nothing be done to aid the merchant marine which would have the effect of aiding the ship building industry, the fate of this also would be a serious question; for it is not reasonable to suppose that the building of Government vessels can continue indefinitely.

No ship yard could think of laying down a plant for the purpose of building one warship, or for the purpose of warship construction alone, even if there were a probability of a continuance of such a policy for some time.

The United States required warships; a number of ship yards have at a great expense put in plants for this work and the Government has been able to secure the ships that it needed; and not only that, but good ships, ships that



are recognized the world over as the best in workmanship and efficiency.

There is a certain responsibility therefore on the part of the government to back up these ship yards at the present time, before the utter cessation of Government work, by such provisions as will enable them to continue on merchant work until the time when they can successfully compete with foreign builders and the ship building industry is firmly established in the United States.

There is positively no reason why ship building should not become one of the greatest industries of the country. There are the raw materials in abundance, there is machinery, there is ingenuity, energy, and capital; absolutely the only thing that is lacking is sufficient work to develop its possibilities.

It is a fact that it costs in the neighborhood of 50 percent more to build ships here than in England, depending, of course, upon the type of ship considered; but this does not mean to say that such would be the case indefinitely. England has been building ships under the most liberal policy of that government for many years; and American yards have never had an equal opportunity of demonstrating what can be done on a similar basis.

Drawing a conclusion from many parallel cases, it may confidently be said that when American yards have been operating even a portion of the time that English yards have been, they will be able to build ships equally as cheaply if not more so.

It cannot be expected, within any reason, that the spasmodic work that has been done so far could have any effect whatever toward cheapening such construction; but once enable the ship owner to lift the handicap of the greater cost of his ships built in this country, thus assisting in creating a demand for ships and putting into our shipyards continuous work for a few years, and the cost of shipbuilding will decrease.

If it be expected that any one act on the part of the government will either reestablish the merchant marine or reduce the cost of shipbuilding at once, then there is no use in attempting a solution of the problem. Such changes can only come about gradually; but they are sure, if handled intelligently and with a steadfast determination in the right direction.

It is only when, by continuous work, construction reaches the point of manufacturing that any material reduction of cost can be secured; spasmodic work tends rather in the other direction.

A large and expensive shipbuilding plant, the same as a large and expensive ship, entails certain fixed charges for interest, insurance, maintenance, upkeep and deterioration; and must be maintained in continuous operation in order that the influence thereof upon the cost of its product may be reduced to a minimum. This is a simple and automatic way of accomplishing this result; but in addition, a large amount of continuous work gradually collects a corps of mechanics skilled in certain lines, systematizes all operations, standardizes the detail parts, permits the introduction of special tools, the numerous duplication of parts, the specializing of the branches of the different trades, and the highest development of mechanical ingenuity in simplifying design and construction.

It is these conditions that enable the English shipyards to build cheaply and rapidly; they manufacture ships instead of building them, and when this is the case, it is even possible, by careful management, to meet the serious handicap of higher wages.

This fact is exemplified in several well known instances where industrial work in other lines, differing but little from that of shipbuilding, has been carried on successfully in competition with foreign builders; but one has only to go through the shops in which this work is turned out to under-

stand how it is done. The American shipyards have never had an opportunity of developing the methods which conduce to cheapness; give them the chance, and there is positively no question of the result. If therefore, foreign nations find it advantageous and necessary to aid their shipping, taking into consideration the fact that their ships cost them less in the first place, then all the greater is the reason for aiding the American shipowner if he is to enter the same field of competition. As to the methods of aiding American shipping, it may be said that the worse the malady the more strenuous must be the measures adopted for its cure.

The American merchant marine is in a desperate condition, and desperate means would be fully warranted to place it on its feet.

Half-way measures would be utterly wasted, a thousand dollars put into some projects would be a dead loss, where two thousand would bring handsome returns.

What is needed now is something that will go beyond the limit of bare necessity in order to be sure of accomplishing the result; it is not good policy to take chances in this manner, which is of the greatest importance to the entire nation and to every individual thereof; nor is it good business, in such straits as we now find ourselves to attempt to invent something new. We need a certainty, not even a probability.

We have a chance to win out on the proposition of establishing the merchant marine on an equal footing with our competitors; and it must be borne in mind that delay only makes the problem more difficult by strengthening them and weakening ourselves; there is no time to waste in experimenting.

We cannot do better than to employ the same weapons that others have used with such success; their methods are sure, even if we do not consider them logical; they may be expensive, but they will prove a good investment.

Our competitors are in the field with large ships, fast ships, ships that will cost us more money to duplicate, and more money to operate; large fleets of ships with well established lines of business, and ships that are subsidized in every imaginable way.

From a business standpoint the only logical way to proceed is to go straight to the adoption of the same system, and to go far enough to insure the growth and advancement of our merchant fleet.

With a fair chance to compete on equal lines, we may safely depend upon the energy and genius of American shipowners and American shipbuilders to work this problem out successfully; they have done it before and they can do it again. By a judicious apportioning of subsidies the benefit can be made to reach all classes of shipping engaged in foreign commerce. It is not possible to make one subsidy reach all and the attempt to do so would not succeed; rather should there be one that could be reached by any one class. Foreign nations subsidize in several ways, and in many cases one line of ships receives subsidies on more than one account.

What is needed at once is a subsidy that will aid in establishing or maintaining regular lines to foreign ports either where the greatest amount of our commerce is going, or where a good trade may be built up. There should also be subsidies for speed vessels carrying the mails, for the mails will always be carried by the fastest vessels, subsidies for vessels suitable for auxiliary cruisers in time of war, and subsidies for vessels so fitted as to be suitable for transports of men and animals in the Government service at other times. The establishment of regular lines of vessels on fixed routes is the only way in which a trade can be built up and this can best be directed by the general Government if, indeed, it is not the only way in which it can be done systematically. It is possible even, for one or two adequately

subsidized vessels in a line to enable the owners to put in a fleet of vessels, which though not subsidized, hold and handle the growing trade induced by the regularity of the line and its direct routes to certain ports.

One of the noticeable effects of ship subsidies is to change the character of the ships as to their safety, efficiency, seaworthiness, and comfort. Where expenses have to be cut down to a minimum in order to operate without loss, it cannot be expected that the highest class of vessels can be used; and the ultimate effect of such conditions must show itself in the character of the ships themselves; for the value of the ship is an actual item in its daily operating expenses.

It has been demonstrated that merchant vessels can be made effective as an adjunct to the army and navy in time of war; not only as auxiliary cruisers, but as transports, dispatch vessels, repair ships, supply ships, and colliers but generally speaking, they are a long way from being suitable for the purpose, and cost too much and require too much time to prepare them, so that they will answer the purpose.

Yet it is possible in the original construction of a merchant vessel to make such provision for her conversion to war uses, as will entail a minimum of expense and particularly of time.

Consider what a powerful resource the Government would have with a sufficient number of merchant vessels, subject to call under pre-arranged agreements, ready for immediate conversion in accordance with plans laid down at the time of their building, and on file in the departments at Washington; to which their construction is thoroughly adapted without any subsequent preparation or extensive changes, and with the expensive part of the work already completed. And then consider the time when these vessels are returned to their former service without all of the work to do over again, duplicating the expense and more than duplicating the time of conversion.

Examine some of the subsidized naval reserve vessels of England or Germany, with gun-foundations already to place and secure a battery of guns; with decks already provided for the reception of those fittings necessary to convey troops or horses; with coal bunkers and decks already arranged to give protection to the waterline; and with thorough and efficient subdivisions and watertightness.

It is possible to go even farther in many ways than these nations have gone, and to so build a merchant vessel that she will make a very efficient auxiliary cruiser, while at the same time not in the least interfering with her efficiency in her regular service.

If this be not done, it will certainly be necessary for the government to build ships particularly designed for the same purpose, and Congress has already begun to appropriate for the construction of vessels on this line; for the ordinary merchant vessel is not capable, with any reasonable expense, of being converted into anything like what it should be for war uses.

So that a standpoint of economy alone, the Government should be more than willing to pay the shipowner for building his ship to suit its needs and to hold her in readiness for its uses when required; particularly if by so doing it thereby takes an important step in aiding to build up the merchant marine.

The Bulletin of the American Iron & Steel Association publishes figures to show that the approximate annual capacity of the blast furnaces in the United States up to Nov. 1st last was 28,635,000 tons.

Charles Delaney, lately with the A. S. Cameron Steam Pump Works, is representing the Harlan & Hollingsworth Co. of Wilmington, Del. in New York City.

## LIVERPOOL SHIPPING LETTER.

Liverpool, Dec. 15.—The second report adopted by the conference of delegates from the South African British colonies, appointed to consider the charges for ocean freights has just been issued. According to it, the witnesses examined are practically unanimous as to the ex-outlined in the spring of this year, is maturing, and as the cessive character of the present ocean freights, and in condemnation of the existing system of deferred rebates. With regard to the effect of the rebate system upon British, as compared with Continental and American trade, the witnesses were unanimous in the view that its effect was injurious and unfair to British manufacturers. It was therefore resolved by the delegates that the various South African Governments should appoint representatives to discuss with the home government in London the terms of the legislation which it is proposed should be introduced into the respective parliaments of South Africa, to give effect to the recommendations of the conference. Should the difficulties of giving effect to the principles outlined in the interim report prove to be unsurmountable, the conference recommends that the South African Governments should introduce legislation making illegal, under penalty, deferred rebates, differential rates of freight, or the granting of any unequal consideration to any shipper or importer.

The great scheme of a Thames ocean wharf, which I outlined in the spring of this year, is maturing and as the capital \$3,000,000 is said to be assured, it is tolerably certain that a portion of the wharf will be ready for use in twelve months from now. As at present proposed the new wharf will have a frontage three-quarters of a mile in length, and capable of being extended to nearly double that length. It will have a 30-ft. minimum depth of water at all tides, with a large pond 25 acres in extent running for 3000 ft. between the wharf and the shore, for barge traffic. The wharf will thus be a transshipment one in the real sense, specially suited for this kind of craft, which will have free access to both ships and rail. Further the minimum depth of 30 ft. of water will enable the largest vessel to berth and leave at all times. This alone will represent great saving of time to large vessels, the enormous importance of which was emphasised before the Royal Commission on the port of London. Although the wharf itself, (being an island wharf) will naturally have a large barge traffic, arrangements, have also been made with the South-Eastern Chatham Railway Co. to construct at their own expense, a branch line across the wharf estate to connect with the wharf sidings, and they have undertaken to make arrangements for dealing satisfactorily with the traffic. Further the wharf will be provided with large sheds, and the loading and unloading equipment will in every respect be thoroughly up-to-date. The project will prove a great boom to London shipping which is surely in need of some such enterprise as this.

The precautions taken by the dock yard authorities at Portsmouth to prevent any details as to the construction of the new battleship Dreadnought from becoming known are very remarkable. Not only are members of the metropolitan police stationed during working hours at the approaches to the building ship, but the plans are being kept under very strict supervision in the chief constructor's department. The complete plans are not accessible at all, and the foreman and others in authority are only allowed to consult the sectional plans for sufficient time to enable them to carry on their work. Under these conditions it is impossible for any outsider to obtain a comprehensive knowledge of the construction of the vessel, which is designed to be the largest, fastest, and most powerful of



British warships. The hull of the vessel is growing rapidly under the hands of the small army of workmen engaged.

The Liverpool Underwriters' Association have just issued their return of casualties to vessels of 500 tons gross register and upwards, which have been posted in the Loss Book during the month ending Oct. 31. It appears that there have been 34 total losses, aggregating 49,256 tons, six being of British registry (2 sail and four steam), of 11,261 tons, and 28 foreign (12 sail and 16 steam), of 37,995 tons. The total losses for the ten months of the current year now number 224 ships, aggregating 387,648 tons. The partial losses and total losses combined were 539, as against 452 in October last year, 474 in October 1903, and 463 in the same month of 1902. The nature of casualty is returned as follows: Strandings, 143; collisions, 140; damage to machinery shafts and propellers, 73; fires and explosions, 25; foundings and abandonments, 9; weather damage, 140, and other causes 9.

The Liverpool Steamship Owners' Association, and the Liverpool Chamber of Commerce are uniting with the object of securing an interview with the British Foreign office to urge upon the Government the importance of maintaining the rights of British ships to trade between Cuba and United States ports. It is pointed out that the trade between Cuba and American ports has been largely carried in British vessels, a considerable number of which were chartered by one of the American lines. The figures for last year show that of 1,000,000 tons of sugar exported from Cuba to the United States, 400,000 tons were carried in British bottoms, and the figures so far obtainable for the present year give 300,000 tons so dealt with. And it is also pointed out that much of the trade development in Cuba consequent upon improved railway facilities has been Government. If the voyage to Cuba is to be construed as American coasting business is being strongly resisted on this side. Dealing with this question the *Shipping Gazette and Lloyd's List* of London says: "This process of developing a native industry by excluding foreign ships is a policy which finds many adherents in the United States, as in Russia and in Spain, but its unfairness in the case of Cuba, for instance, is manifest, and if insisted upon, will no doubt evoke a proper protest from the British Government. If the voyage to Cuba is to be construed as 'coasting' why not consistently carry the argument to the reductio ad absurdum, and also include the Philippines?" The deportation will wait upon Lord Lansdowne shortly when the Liverpool shipowners who have a good deal at stake in the matter will be able to represent their case clearly and fully to the foreign secretary.

In the British shipbuilding trade, the greatest activity prevails, and everywhere the despondent feeling created by the recent dullness of trade has given place to high expectancy. The Scottish builders have more work on hand than has been the case for some years, and the figures are most encouraging. During October 42 vessels, aggregating 64,211 tons have been launched. Since the first of January last the total output has been 287 vessels with a total of about 257,500 tons. This exceeds by over 11,000 tons the record of 1902. The orders reported booked during October are for 47 vessels of 100,000 tons. For the ten months of the year the orders for the whole of the Scotch yards represent over 513,000 tons.

For the first time for at least a number of years a steamer has been placed on the loading berth at Glasgow for San Francisco. The vessel is the Bessie Dollar, recently launched by Messrs. A. Rodger & Co., Port Glasgow for the Robert Dollar Company of San Francisco. Up to the present no shipowner has considered it worth while to

exploit the possibility of a trade between the Clyde and the North Pacific port, and the few runs within recent years have been by sailing craft. The Robert Dollar Company are hopeful of securing a good cargo for the Bessie Dollar, which will clear towards the middle of November. Should the result be at all encouraging, it is said that a regular service—with perhaps a sailing once a month—may be maintained. Most of the steamers of the Robert Dollar Company have been built on the Clyde, and it is probable that the Port Glasgow firm may secure an order shortly for another steamer for the same owners.

The Liverpool Steamship Owners' Association is seeking the aid of other British shipowning associations as well as Chambers of Commerce throughout the country with a view to the appointment by the government at an early date of an expert committee to consider the advisability of adopting a system of national indemnity against loss from capture at sea in the time of war, and if thought desirable, to frame a scheme to meet the wants of the country; and further to consider the advisability of effecting an international agreement that private property should be altogether exempt from capture in time of war. It is interesting to here add that a Royal commission has already recommended that a small expert committee should be appointed to investigate the subject, and prepare a scheme afterwards to be embodied in an act of Parliament. It is contended that unless something in this direction is done, should war break out, Britain will have to follow the example of the United States who found it necessary in their war with Spain to guarantee their own ships and cargoes against loss by the enemy, by proclamation, without having any scheme or organization or rules prepared for the protection of the State and the direction of the commercial community. Among the many projects for reform in army and navy, this project is singular in this—it will cost nothing in time of peace, and will not cost, but save, money in time of war, and at the same time it would in the language of the report of the Royal Commission, operate both as an additional security to the maintenance of British over-sea trade, and as an important steadying influence upon prices.

Orders have just been given by the British Admiralty for the construction of five ocean-going destroyers for the Royal navy, which were provided for in the estimate for the current year. The details of the new vessels are not yet known, but it is understood that their speed will be greater than that of the existing destroyers. The new boats are to be named Afridi, Ghurkha, Tartar, Cossack, and Mohawk. The firms of Armstrong Mitchell & Co.; Hawthorn, Leslie & Co.; Cammell, Laird & Co.; J. S. White & Co.; and Thornycroft & Co. will each build one of the new destroyers.

Representative Wm. H. Wiley, of New Jersey, has introduced in the house of representatives a bill to call an international conference for the purpose of securing an international agreement regarding emigration. One of the points made in the bill as worthy of consideration, is the prohibition by international agreement to the overloading of emigrant ships. It has been brought to the attention of congress that in coming ocean steamers are overcrowded beyond the capacity of their life boats and life rafts. There is a sentiment that the number of emigrants on any ship should not be proportioned to the tonnage of the ship but rather to the facilities carried by the ship for saving life.

H. D. Tendixsen, Eureka, Cal. is building a steam schooner for the Hammond Lumber Co. of San Francisco.





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Such an excellent security is the steamship bond that the legislature of Michigan has made it a legal investment for state saving banks. There could probably be no better endorsement of a bond than this. In fact so eagerly are these securities seized upon, that it is rarely necessary to resort to the usual brokerage houses to find a market for them. The steamship bond as it is known on the great lakes, is issued to financially facilitate the building of the great steel freighters which are principally designed for the ore trade. With the exception of a few steamers built for the steel-producing companies, which have abundant capital, all of the latter-day ore carriers have been built upon bonds. So thoroughly is this bond safeguarded that there is no possibility of default either in principal or in interest. The total issue of bonds on any steamer represents only one-half the actual constructive value of the vessel, while the bond is a lien upon the whole of it. It is also a lien upon the insurance which must be imperatively carried

under the terms of the bond. Moreover, a steamer is required to be operated upon a cash basis so that no debts accumulate against her. The rate of interest is high, being 5 percent, and it is no wonder, considering the absolute integrity of the security that saving banks are permitted to invest the funds of the people in them. The steamship bond is recommended to anyone who desires to make a safe and profitable investment.

An admirable plea for an awakening of sentiment in behalf of the Merchant Marine League of the United States in the foreign trade was made by Harvey D. Goulder, president of the Merchant Marine League of the United States before the Commercial Club at Cincinnati, recently. He spoke bravely for subsidy in spite of the prejudice which that word appears to arouse in the interior. The use of the word subsidy seems to inspire hostility only when applied to shipping. When applied to any other department of industry it seems to have a grateful sound. Mr. Goulder said that over \$188,000,000 is annually paid out by the manufacturers of the United States for the over-sea carriage of their imports and exports. Of this vast sum of money only 10 percent is earned by American ships. Mr. Goulder thought that every nation had a natural right to the carriage of at least 50 percent of its imports and exports, and that if any artificial condition exists that prevents that country from enjoying its just share of such trade it should be removed by governmental legislation. He pointed to the development of commerce on the great lakes, which is one of the wonders of the world, a ton of freight being moved one mile for seven-tenths of a mill as against 4 mills on a few of the trunk lines favored with fine roadbeds and 8½ mills as the average of the whole railway system of the United States. Mr. Goulder stated that everything else in the United States had been protected but shipping, and he thought in common justice the beneficence of the protective policy should also be extended to that industry.

During the season just closed over 33,000,000 tons of iron ore was brought down the great lakes, of which 30,000,000 came to Lake Erie docks. There remained on Lake Erie docks at the end of the season, approximately 6,500,000 tons of ore. At the opening of the season there were on Lake Erie docks 2,271,631 tons, thus showing that the movement of 1905 was practically a direct transfer from mine to furnace. While Lake Erie docks received in 1905 over 10,000,000 more tons of ore than they did in 1904, the docks on Dec. 1 held scarcely 1,000,000 tons more than they did in 1904. This is an extraordinary record because to accomplish it the ships and railways had to act in conjunction. Cars had to be in readiness when the ship reached the dock. They were in readiness practi-



cally throughout the entire season. However, in the latter part of December the railways were compelled to divert a considerable part of rolling stock to other branches of trade. There probably is not an industry in the world, covering so widespread a territory, that is handled with such superb precision as the iron ore trade of the great lakes. The receiving docks at the head of the lakes have practically no storage room in proportion to the amount which they annually forward. The ore can rest in the pockets for a very few hours, at the most, sometimes not at all, passing directly in the hold of a ship. The trains which bring this ore from the mines thunder down upon the docks at half hour intervals and it requires not only great skill, but a great deal of courage to handle these swiftly moving parts, unload their cargoes and sidetrack them before the next train arrives. The problem of handling iron ore cheaply and quickly has been attacked by a number of inventive minds, until today the system has well-nigh reached perfection. To load a 10,000-ton steamer in 80 minutes and unload her in 250 minutes is no mean accomplishment.

#### COMMERCE OF SAULT STE. MARIE CANALS.

The summary of commerce through the Sault Ste. Marie canals, prepared by the superintendent of the canal has just been issued, and shows that the commerce reached the great total of 44,270,680 tons against 31,546,106 tons in 1904. This record is 8,309,534 greater than the record breaking year of 1902 when 35,961,146 tons were moved. The following is the comparative summary for the past two years:

	Seasons		Increase	
	1904	1905	Per cent.	Per cent.
<b>Vessels:</b>				
Steamers - - - Number	12,188	17,197	41	
Sailing - - - Number	2,994	3,263	9	
Unregistered - - - Number	938	1,219	36	
Passages - - - Number	16,129	21,679	34	
Lockages - - - Number	10,315	13,732	34	
<b>Tonnage:</b>				
Registered - - - Net tons	24,364,138	36,617,699	50	
Freight - - - Net tons	31,546,106	44,270,680	40	
Passengers - - - Number	37,895	51,204	44	
<b>Coal:</b>				
Hard - - - Net tons	991,228	984,701		1
Soft - - - Net tons	5,463,641	5,524,355	1	
Flour - - - Barrels	4,710,538	5,772,719	23	
Wheat - - - Bushels	49,928,896	68,321,288	37	
Grain - - - Bushels	33,030,922	39,229,553	19	
(Other Than Wheat.)				
M'fact'd & Pig Iron, Net tons	229,995	237,696	3	
Salt - - - Barrels	365,459	423,122	16	
Copper - - - Net tons	109,600	106,520		3
Iron Ore - - - Net tons	19,635,797	31,332,637	60	
Lumber - - - M.ft B.M.	923,250	966,806	5	
Silver Ore - - - Net tons	1,356	41		97
Building Stone - - Net tons	27,093	10,899		60
General Merch'dise, Net tons	722,009	836,583	14	

The United States canal was opened April 14 and closed December 16, 1905; season, 246 days.

The Canadian canal was opened April 10 and closed December 20, 1905; season, 255 days.

Joseph Raymond Prefontaine, Canadian minister of marine, died suddenly at Paris last week. He was born at Longueuil, Province of Quebec, September, 1850, and was educated at McGill University, Montreal. He was for many years a member of the Dominion house of commons and for the past three years had been minister of marine.

#### ORE IN DOCK DEC. 1.

Owing to the fact that one of the ore docks has not yet reported it is impossible to publish the total ore receipts at Lake Erie ports and the amount on dock on Dec. 1 by ports. It is hoped that this tabulated statement may be published next week. With the exception of this one dock Lake Erie's receipts for the season of 1905 were 29,012,754 tons and the amount on dock Dec. 1 was 6,746,410 tons. The ore receipts on Lake Erie in 1904 were 17,934,814 tons and the amount on dock Dec. 1, 1904 was 5,763,399 tons. Thus it will be seen that although the ore receipts at Lake Erie during 1905 were 11,000,000 tons more than those of 1904, the actual amount on dock is only 1,000,000 tons greater, showing that an increased proportion of ore was unloaded directly into cars.

The Pittsburg Steamship Co. has not, as yet, chartered any tonnage for 1906, but it will probably distribute its business among the various vessel owners within the next few days. While no figures are obtainable probably tonnage to move 8,000,000 tons will be chartered at 75 cents. Independent interests have already sold something like 15,000,000 tons of ore for 1906 delivery, so granting a movement of 20,000,000 tons to the Steel Corporation, 35,000,000 tons will be moved on the great lakes next year.

#### LAUNCH OF THE STEAMER JAMES B. WOOD.

The steamer James B. Wood was launched from the West Bay City yard of the American Ship Building Co., on Saturday last. This vessel is building for the Gilchrist Transportation Co., of Cleveland.

Miss Martha D. Wood, of Bellevue, O., daughter of James B. Wood, after whom the boat is named, was sponsor. In the launching party were Mr. Wood, who is a director of the Gilchrist company, and Mrs. Wood; Capt. J. L. Weeks, of Cleveland, commodore of the Gilchrist fleet; J. D. Mitchell, chief engineer of the fleet; John D. Gilchrist and John Wood, Jr., of Norwalk, O.

The Wood is 534 ft. over all, 514 ft. keel, 54 ft. beam, and 31 ft. molded depth. She is of the arch type of construction and has sixteen hatches, with 9 ft. openings and 24 ft. centers; four hatches to each compartment. They are of the triple expansion type, 22½, 36 and 60 in., with 42 in. stroke. Steam is supplied by two Scotch boilers, with Ellis & Eaves forced draft.

The Wood's berth will be occupied by the keel of the Charles A. Weston, the 560-footer to be built for the Tonawanda Transit Co., of which William M. Mills is manager.

#### HAWGOODS ORDER THIRD STEAMER

Henry A. Hawgood and his son, H. P. Hawgood, gave an order to the American Ship Building Co. last week for a steamer to be a duplicate of the James C. Wallace, and to be delivered late next season. It will be 552 ft. over all, 532 ft. keel, 56 ft. beam, 31 ft. deep and will have a carrying capacity of about 11,000 tons. This makes the third order which has been placed with the American Ship Building Co. by the Hawgoods, and is the thirty-first contract which this ship building company has taken for steamers for 1906 delivery.

Capt. John Mitchell has decided to name the first of the two 10,000-ton steamers building for him at the Lorain yard of the American Ship Building Co., Joseph Sellwood after the well-known mine owner of Duluth. The Sellwood will be launched Saturday, Jan. 6. The second steamer will be named after Mr. Loftus Cuddy, of Cleveland, and will be launched in February. Both of these are 545 ft. over all, 525 ft. keel, 55 ft. beam and 31 ft. deep.

### THE IMPROVEMENT OF THE MISSISSIPPI.

The governors and congressmen of the states of the Mississippi valley have been consulted by the Business Men's League of St. Louis upon the advisability of calling a convention in St. Louis for the purpose of agreeing on a practical plan for the improvement of the Mississippi river. The movement is very generally indorsed but it is suggested that the convention be not held until a representative attendance could be secured which would not be possible while congress was in session. Following are some of the replies which Secretary W. F. Saunders of the Business Men's League has received:

Senator William J. Stone:—"If your meeting is called I will certainly attend if it is possible for me to do so."

Governor Joseph W. Folk:—"I am in hearty sympathy with the movement and will be glad to co-operate in every way possible."

Congressman Richard Bartholdt:—"No effort will be too great for me to subserve the cause in which we are all so much interested, namely, to secure the necessary appropriations for the improvement of the Mississippi river."

Governor Albert B. Cummins:—"I am deeply interested in the project, and believe that I appreciate the importance of the undertaking. You can always count upon my help in any way that I can give it."

Congressman John J. Jenkins:—"I shall be extremely glad to co-operate with you. You have my sympathy and will have all the assistance I can render."

Congressman William B. McKinley:—"My interest in St. Louis is such that anything Congress may be induced to do to insure the further prosperity of your city will receive my cordial support."

Congressman W. T. Tyndall:—"I am in hearty accord with the work, and will do all I can to secure appropriations for river work."

Congressman Finis J. Garritt:—"I am in full sympathy with the movement for increasing the annual appropriations for rivers and harbors work generally, and, of course, being situated on the Mississippi, am particularly interested in increasing the expenditures upon that."

Senator J. H. Millard: "My constituents fully realize the importance of the subject, and they look to me to support any movement looking to Missouri river improvement."

Congressman Robert Bruce Macon:—"I certainly know the commercial value to the States of the Mississippi valley, of the improvement of the Mississippi river. My opinion is that the conditions are such that the people of the States affected by the Mississippi river should act as one individual in a Herculean effort to have this great river improved from St. Paul to its mouth. You of the upper river need a deeper channel, while we need levees, and we are ready to join hands with you to get what you want, and trust to your magnanimity to help us. I approve of the convention that your league is planning to formulate a definite plan of improvement and a definite request for money needed to carry out the plan made to Congress."

Congressman Theodore Otjem: "I am in accord with the purposes of the convention, but think that I will not be able to attend."

Congressman Frank S. Dickson:—"I shall be glad, indeed, to co-operate in any possible manner in the furtherment of this desirable matter."

Congressman Minor Wallace: "I assure you of my cordial interest in the premises and desire to attend."

Senator Moses E. Clapp: "I certainly favor the improvement of the river, and would at all times do what I could to secure the sum."

Congressman Swager Sherley: "I consider it unimportant whether members of Congress are there or not. What is to be desired is that through such conventions expression be given of the people's desire for increased expenditure for river and harbor work."

Senator William Warner:—"I am thoroughly in sympathy with this movement, but at the same time feel that the Missouri river is entitled to consideration."

Congressman Zeno J. Rives:—"If it is possible for me to attend, I will be very glad to do so."

Senator Robert J. Gamble:—"I appreciate the importance of this great waterway and would be very glad to co-operate looking to proper recognition of the interests involved."

Congressman J. D. Bowersock:—"No doubt I will be fully in accord with the object of the convention, and realize to some extent, I trust, the importance of this great waterway and the necessity of its improvement and its protection."

Congressman John J. Esch:—"As to my position on the question of the improvement of the river, I am pleased to state that I am not merely friendly, but strongly in favor of such improvement."

Congressman J. C. Floyd:—"I am in full sympathy with every movement to improve our rivers and especially the Mississippi, the greatest of them all, and I shall be glad to attend your convention and will do so if I am not unavoidably prevented from so doing."

Congressman J. M. Richardson:—"I shall be glad to assist you in all proper ways in any improvement plan you have before Congress."

Congressman James A. Tawney:—"I would cheerfully co-operate with you and your league in the formulation of some plan for the work which you have in view, but whether I will be able to attend a convention called for the purpose of considering the matter of improvements of the Mississippi river, held in St. Louis, I am unable to say."

Congressman Edgar C. Ellis:—"I am in hearty accord with the objects to be attained as expressed in your letter."

Congressman C. M. Shartel:—"I am grateful to you for the kind consideration shown me in the matter and I shall endeavor to attend."

Governor E. W. Boch: "I am heartily in favor of the project."

Governor J. C. W. Beckham:—"I appreciate the invitation and approve of every reasonable effort to further the interest of this section."

Congressman D. H. Smith:—"I shall earnestly co-operate in all proper efforts to secure such improvement."

Senator A. J. McLaurin:—"I am in favor of liberal appropriations for the improvement of the Mississippi river."

Congressman John F. Lacey:—"I have always favored liberal appropriations for rivers and harbors. And our State is especially interested in the Mississippi river."

Congressman Ernest E. Wood:—"I thoroughly approve of your plan of calling a convention this winter for the purpose of discussing the improvement of the Mississippi river. If such a convention is called I shall expect to be present. You can count on me to assist in the matter to the extent of my power."

Congressman Adolph Meyer:—"I am in hearty sympathy with the movement, and shall be pleased to attend the convention if my duties at the seat of Government will permit."

Congressman Fred C. Stevens:—"I have been, and am strongly in favor of improving the Mississippi river, and am always glad to assist in any way I can."



Governor Charles S. Deneen:—"It is hardly necessary to add that I approve of the purpose of the convention, and that I shall cheerfully co-operate with you in making it a success."

Congressman S. Brundidge Jr.:—"I appreciate very fully the importance of such a movement, and the great advantage to be acquired by the improvement of the Mississippi. You can at all times depend upon me to render you whatever assistance is in my power."

Congressman W. E. Brown:—"I am in sympathy with the proposition to improve the Mississippi with the idea of making it permanently navigable, and will favor any reasonable proposition in Congress which has that end in view."

Congressman G. P. Padgett:—"I feel a deep interest in the improvement of our waterways, and I am always glad to aid well-directed efforts to improve them."

Congressman Champ Clark:—"I think my votes have given evidence that I am in sympathy with all movements for the betterment of the Mississippi, though I cannot attend the convention. At that time I shall have to be in Washington, where I shall neglect no opportunity to work and vote for any proposition tending in the desired direction."

Congressman B. G. Humphreys:—"I shall take great pleasure in attending the convention and doing whatever I can to further the objects desired."

Congressman Charles Curtis:—"It has always given me pleasure to assist in securing appropriations for the improvement of the Mississippi."

Congressman Chas. H. Weiss:—"You can rest assured that I will assist in any reasonable appropriation for the Mississippi river at all times as I believe it would be far better if the present administration would pay more attention to their home trade instead of going over to the Philippines and spending millions of dollars on an island, the commerce of which does not amount to that of the city of St. Louis."

Senator W. B. Allison:—"I am in sympathy with the general plan for the improvement of the river from St. Paul and Minneapolis to its mouth, and will be glad to do what I can properly to promote the cause."

Congressman Nathan W. Hale:—"It will afford me pleasure to be present at said meeting."

#### THE SITUATION AT BUFFALO.

Buffalo, Dec. 26.—"A phenomenal season," was the ready reply of one of the best-posted lake men, when asked of the outlook and he at once proceeded to give his reasons for the opinion. Most of these are pretty well known, of course, by vessel owners, though possible they have not all observed that everything known so far that has a bearing on the season of 1906 is favorable to a great amount of business. Even the lumber trade, which promises less than anything else, according to what it has been, is not a hopeless case, for the Georgian Bay cut is sure to be large and at least a fair amount will still come from Lake Superior and the west side of Lake Michigan.

Lumber barge owners are not exactly easy over the future of the fleet. They say that so many vessels have gone out of business that the fleet would be small naturally, but there are always old vessels from the grain and ore business to drop down into lumber and there is room for fearing that there will now be a rush to fill up the gap and it will be overdone. Still there were not lumber barges enough for the last half of this season and it will take a good many to overdo the supply.

It is pretty certain that there will be more grain to carry than there has been in a long time, even if the railroads do get hold of a great part of the corn that used to

come down by lake. Of course it is said that grain is now a mere incident in the lake trade, but it helps, and especially when it pays above 5 cents a bushel as it did at the close of the present season from Lake Superior. Not a few of the big carriers laid up here loaded will pay a decidedly better dividend than they would have done if they had stuck to ore. Grain can be carried later than ore can and when there is any to come then it pays well. Besides it fills in all summer if it is at all plenty.

Of course the ore trade sets the whole pace and that has never started as it is starting now. With more than 33,000,000 tons brought down during the season there is no surplus and it will be necessary to begin on it again just as soon as the lakes are open. There will be no waiting next spring and trying to shorten the season by restricting the start. The tonnage is not going to be what it would be naturally, though one might call it ample for ordinary purposes. The prospect is that next season will not be an ordinary one.

"I want to go on record," said the vessel man, "as predicting that the lakes will move fully 40,000,000 tons of ore. With business at all what it promises to be we shall need as much as that and of course it means quite a big addition to the fleet. Already the individual vessel owners have taken 8,000,000 tons to carry, without the trust fleet going into the market at all. Such activity has never been approached before and it means everything to the trade of next year."

Some of the business men who are scanning the horizon for pointers are saying that they feel sure of a good run of practically everything for at least 18 months and they are laying their lines accordingly. This view is outside of the lake trade and is valuable on account of introducing a side light into the question. If there are those who take a less hopeful view of the outlook I have not found them.

Nothing has been said of coal in this connection, but that is pretty sure to do its full share. The spectacle of soft coal going forward by lake after the middle of December and of hard coal loading in quantity here is as unusual as the other good indications. Buffalo is a little more than 100,000 tons short of last season in hard-coal shipments, though but for the car shortage, which kept the coal short and too plenty on the upper-lake docks there would have been at least fully as much shipped now as there was last season.

Then the two heaviest hard-coal shippers here, the Lackawanna and Lehigh Valley are both adding to their facilities for stocking and handling it here, not to mention the new ore dock of the Pennsylvania Railroad Company here, which will handle coal as well as ore, and was not built to look at. Buffalo is the center of the package, freight trade and the indications at the end of the present season are that the scant shipments for a season or two have been merely because the quantity was small and the prices were too high for the export of flour. There was such a rush of flour on the finish of the season that it was impossible to handle it here promptly, while at the same time some of the shippers complained that they could not return out on the moment as much as they desired to ship.

A small matter, perhaps, considering the state of the canal, but boatmen announce that quite a fleet will be built this winter, without waiting for the enlarged canal.

Frank Maytham announces that he has opened an office for the general practice of law at No. 20 Marine Exchange building Buffalo, N. Y. A specialty of maritime law will be made.

**COREY IN DRY DOCK.**

The steamer William E. Corey, which went ashore on Gull Island has been placed in dry dock at Superior. She is not as badly damaged as might have been expected, her injuries being confined entirely to the bottom and not extending to the turn of the bilge. About eighty plates will have to be taken off. The steamer England was also placed in dry dock at Superior. Her bottom is pushed up for a distance of about 150 ft., and a large number of plates will have to be taken off for rerolling. Both the England and Corey will stay in dry dock until spring. Some comparisons have been instituted between the injuries of the Corey and the steamer Hutchinson which went ashore near Eagle River three years ago, but it is understood that the injuries are as extensive as those of the Hutchinson. The steamer Crescent City, which was driven ashore near Duluth, will remain in its present position all winter. The big steamer will have to be jacked off the rocks and the work cannot be done until next spring. The Mataafa, Edenborn and the barge Manila will also remain on the beach all winter.

**SHIP CANAL FROM CHICAGO TO ST. LOUIS.**

Representative W. H. Lorimer, of Chicago, has introduced a bill appropriating \$31,000,000 for a 14-foot ship canal from Chicago to St. Louis, and thence to the Gulf of Mexico. In urging the passage of the bill Mr. Lorimer said:

"The Mississippi valley is the largest and richest of all the valleys of the known world. It is capable of producing more from its mines, fields and forests than any other similar area of land upon the face of the earth. Its development is retarded from the need of cheap transportation to the seaboard. Water is the cheapest transportation known to commerce. The city of Chicago has constructed the largest ship and drainage canal in the world at a cost of \$50,000,000 to date, which when completed will have cost Chicago \$75,000,000. With the completion of the canal at the Isthmus and the improvement of the Mississippi Valley waterways, the greatest inland waterway in the world will be created, connecting the Central, Western and Southern States with the Atlantic and Pacific coast states, Hawaii, Alaska, the Philippines, the Orient and every seaport in Europe. Congress appropriated \$200,000 to make a survey of the Mississippi, Illinois and Des Plaines rivers from St. Louis to Lockport, Ill., or to the mouth of the Chicago ship canal, to determine the feasibility of establishing a fourteen-foot waterway from Chicago to St. Louis. The survey has been completed and the feasibility of a 14-foot waterway from Chicago to St. Louis has thus been established. It is estimated by the engineering corps of the war department that the work covered by the survey can be finished for \$31,000,000"

**NATIONAL RIVERS AND HARBORS CONGRESS.**

With not less than 1,000 delegates in attendance the National Rivers and Harbors Congress will convene in the Arlington Hotel, Washington, Jan. 15, and there is every indication that the meeting will result in securing large appropriations for the further improvement of the nation's waterways. Word was received by Albert Bettinger, who has taken a lively interest in the improvement of the Ohio river from Pittsburg to Cairo, that preliminary plans had about been completed by the executive committee in Baltimore. It was stated that messages had been received from congressmen in many different parts of the country that they intended to take active part in convention, and that the nation's legislative body was ready to do everything in its power to further the interests of

the different cities and states by assisting in raising the stages of the navigable rivers and improving the harbors. The executive committee has sent out requests to the governors of every state in the union asking that they appoint their congressional delegates as special delegates to the two day convention in Washington.

The governors are also invited to attend and several have already signified their intentions of doing so. According to the plans outlined each state is to have one or more speakers at the congress, and needed improvements in every section will be freely discussed, although action will be taken by the congress only upon the general need of the country for improved waterways and harbors. While the delegates from Cincinnati will devote most of their time to pointing out the needs of the Ohio river, they agree that no action will be taken on special projects and they will have to await the completion of the survey of the river which is now being made under the supervision of the war department.

The engineers have completed their work for several miles below Louisville, but it will be almost a year before a comprehensive report can be made to the war department by the men in charge of the work. They are making their surveys with the idea of securing a 9 ft. stage between Pittsburg and Cairo, this to be attained by building locks and dams at different points along the Ohio, and it is conceded by all interested parties that it will mean a tremendous outlay of money, although the results will more than offset the expenditure.

**WHO KNOWS ABOUT CHARLES SCOTT STOWMAN?**

Editor *Marine Review*: I desire to inquire as to the loss of a vessel on Lake Superior. I had a son on the lakes, and the report has just reached me that he was on a boat that went down some time in July, and the crew of seven were all drowned. I do not know the name of the boat. My son's name was Charles Scott Stowman. While in Toledo he boarded at No. 236 Huron street. I would like to ascertain if the report of the wreck is true, and if so what they did with his body, as I understand that the bodies were recovered.

Hitchcock, South Dakota.

F. P. STOWMAN,

The tug Hugh L. Bond, building for the Baltimore & Ohio Railroad Co., was launched last week from the yard of the Baltimore Dry Dock & Ship Building Co. The tug is 118 ft. long, 23 ft. beam and 12½ ft. deep. The machinery will be of fore and aft compound type, with cylinders 20 and 40 in. in diameter and 28 in. stroke. The tug is named after Mr. Hugh L. Bond, second vice president of the Baltimore & Ohio Railroad.

Permission for Col. Thomas W. Symons, New York, former aide to the president, to receive the Chinese decoration of the order of the double dragon, is asked of congress in a letter transmitted from the state department. The decoration was awarded to Col. Symons by the Chinese government because of courtesies extended to Prince Pu Lum on his visit to the United States a year ago.

The Dubuque Iron Works, Dubuque, Ia., is to build a car transfer for the St. Louis & Mississippi Railway Transportation Co., for service between Vicksburg and Delta. She will be named the Albatross.

Moses Maynard, of Hancock, Mich., has been granted a patent on an apparatus to hoist steel plates which is especially applicable to shipyard work.



**MERCHANT MARINE—A RETROSPECT.**

Judged by the ships that have been put in service during the present year, the tendency among the trans-Atlantic steamship companies is to build combined freight and passenger steamships of moderate speed and large carrying capacity, rather than high-speed vessels such as the *Lucania*, *Deutschland*, and *Kaiser Wilhelm*, in which the demands of the motive power for space prohibit the carrying of cargo. On the other hand the North German Lloyd Company has given orders for the construction of another 23½-knot steamer of the same size as the *Kaiser Wilhelm II.*, and the Cunard Company has under construction two 25-knot vessels that are to be about 800 feet in length. During the year, three vessels of the largest size have been added to the already large fleets that trade with American ports. In March of this year the new steamship *Caronia* of the Cunard Line made her maiden trip, and as we go to press the *Carmania*, a sister vessel is on her maiden trip to New York. The *Caronia*, driven by reciprocating engines, made on her trial a speed of 19.5 knots, and the *Carmania* made about a knot more, or 20.43 knots on her trial trip. In the spring of the year the American-built 15-knot *Dakota*, 630 feet in length, a sister of the *Minnesota*, sailed from New York for Seattle to make her maiden trip from Seattle to Japan. Toward the close of October the Hamburg-American Line dispatched to New York the new twin-screw 17-knot liner *Amerika*, a vessel of the same popular passenger-and-cargo type, which is remarkable for the extraordinary richness and novelty of her appointments. The increase in size of trans-Atlantic ships has had its counterpart in some of the huge cargo vessels that have been turned out this year for the ore-carrying trade on the great lakes. Among these are four vessels, known as the *Gary*, *Corey*, *Perkins*, and *Frick*, which are each 569 feet long, and are estimated to carry about 15,000 tons of ore at a single trip. There has been a steady advance in the application of devices to render travel upon the high seas more safe, chief among which may be mentioned the method of closing all bulkhead doors from the navigation bridge, the further extension of wireless telegraphy, without which no ocean steamer is today considered to be fully equipped, and the introduction of the system of signaling under water by means of the submarine bell. This last may be considered as one of the most important safeguards yet introduced against the perils of fog and thick weather. Other interesting and valuable developments that may be mentioned are the use of the gyroscope to prevent excessive rolling, and also its application as a check upon the mariner's compass; and the successful introduction of an electric dead reckoner by which the course, distance sailed, and speed of a ship are automatically drawn upon a chart.—*Scientific American*.

**GERMANY AFTER SOUTH AMERICAN TRADE.**

Editor *Marine Review*:—Germany is after South American trade with renewed vigor. The "Compania de Navegacao Cruzeiro do Sul," which was recently established with its headquarters at Santos, in Brazil, by the Hamburg-South American Steam Shipping Co., in combination with Hamburg-American Line, says the *London Times*, has now been fitted out with the requisite complement of steamers. The new company, which is primarily designed to engage in the coasting trade of Brazil, will not only set up communication between the various Brazilian ports but will also facilitate and expedite the distribution of goods (German) imported from Europe by the two great Hamburg shipping companies to the east coast of South America. The initial fleet will be five steamers. The Germans want

foreign trade and send ships to get it. We want foreign trade but have no ships to send to get it, consequently, Germany's advantage over us in this "foreign trade quest" is very great.

Schenectady, N. Y.

WALTER J. BALLARD.

**IMPORTANT RAILWAY DECISIONS.**

Two recent decisions of state courts involving the favorable or unfavorable attitude of a railroad toward the transportation of certain raw materials over its line, according to the way it affected its "business interests," are of importance. The North Carolina supreme court, in *Hilton Lumber Co. vs. Atlantic Coast Line Railroad Co.*, (46 S. E. Rep., 813), held that, under the laws of that state providing that any carrier charging one person more than another for the same service is guilty of discrimination, a railroad carrying raw material to factories can not charge a factory which agrees to ship the manufactured product by the same road less for the same service than it charges a factory which will make no such agreement.

The supreme court of Georgia, in *Central of Georgia Railway Co. vs. Augusta Brokerage Co.*, (69 L. R. A., 119) declared that a carrier may discriminate in facilities against shipments of cotton seed, because such shipments diverted from the road profitable shipments of articles manufactured out of the seed.

A statute of Maryland requires carriers to provide separate coaches for the transportation of white and colored passengers, and makes it an offense for a passenger to refuse to occupy the seat to which he is assigned by the conductor. The constitutionality of this law was tested this year and the supreme court of Maryland held it valid in so far as it affects commerce wholly within the state, but invalid as to interstate passengers under the commerce clause of the federal constitution.

The constantly increasing sea traffic between San Francisco and Portland, has compelled the Harriman interests to place on the line four steamers in all. These vessels are the *Columbia*, *Senator*, *Costa Rica*, and *Homer*. Even these steamers are inadequate to meet the demand. Negotiations are now pending for the purchase of another vessel—a combined passenger and freight boat.

The Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, have entered a claim against the government for \$480,231.90 damages arising out of the delay in concluding the battleship *Indiana*. The battleship should have been concluded in three years but was not completed until five owing to the government's inability to furnish material.

The hull of the gasoline schooner *Wascalore* will be constructed at the Kruse yards, Coas Bay, for the Wendling Lumber Co. The Union Gas Engine Co. of San Francisco will install in the schooner two or three cylinder engines of 250 H. P. fitted to use crude oil.

An effort is being made to have the name of the *Fern*, which is doing duty as a training ship for the naval militia of Minnesota, changed to *Gopher*. The *Fern* was the first naval ship to enter the harbor of Havana after the blowing up of the *Maine*. Aboard her the court of inquiry into that affair was held.

The Oceanic Steamship Co., of San Francisco, is negotiating for a suitable steamer to be placed on the route between San Francisco and Australia.

The new floating dry dock of the Merrell-Stevens Co., Jacksonville, Fla., is about ready for business.

# TURBINE STEAMERS, I

Date.	Vessel.	Service.	Owner.	Builder.	Length.	Beam.
1894*	Turbinia	Experimental.	Parsons.	Parsons	103	9
1901	King Edward	Pleasure Steamer.	Turbine Steamers, Ltd.	Denny.	250	30
1902	Queen Alexandra	do.	do	do	270	32
1899	Viper	T. B. D.	R. N.	Hawthorn Leslie	210	21
do.	Cobra	do	do	Armstrong	223	20
1903	Velox	do	do	Hawthorn-Leslie	210	21
1904	Eden	do	do	do	220	23
1905	Coastal Destroyers	do	do	Thornycroft, Yarrow & White	175	
do.	Ocean-going Destroyers	do	do	Laird-Thornycroft	250	
do.	Experimental Destroyers	do	do	do	320	
1903	Tarantula	S. Y.	W. K. Vanderbilt.	Yarrow.	528 1	15 3
do.	Lorena	do	A. L. Barber.	Kamage & Ferguson	253	35 3
do.	Emerald	do	Sir C. Furness	Stephens	198	25 7
1905	Albion	do	Sir G. Newnes	Swan & Hunter	270	34
do.	Narcissus	do	A. E. Mundy	Fairfield	245	27 6
do.	Royal Yacht	do	H. M. King Edward	A. J. Inglis	310	
do.	Mahroussah	do	The Khedive of Egypt	Rebuilding by do.	400	42
1903	The Queen	Channel Steamer	S. E. & Chatham Rly. Co.	Denny.	310	40
do.	Brighton	do	L. B. & South Coast Rly. Co.	do	280	34
1904	Princess Maud	do	Stranraer & Larne Service	do	300	40
do.	Londonderry	do	Mid and Rly.	do	330	42
do.	Manxman	do	do	Vickers	330	43
1905	Viking	do	Isle of Man S. S. Co.	Armstrong	300	42
do.	Onward	do	S. E. & Chatham Rly. Co.	Denny	310	40
do.	Dieppe	do	L. B. & S. Coast Rly. Co.	Fairfield	290	34
do.	do	do	G. & J. Burns	do		
do.	do	do	Great Western Rly.	John Brown Co. & Laird & Co.	350	40
do.	Princess Elizabeth	do	Belgian Govt.	Cockerill	355	40
do.	do	do	do	Vulcan Co.	360	38
1904	Lhasa	Hamburg-Heligoland	British India S. S. Co.	Denny	275	44
do.	Loongana	India Coast Service	do	do		
do.	Turbinia II	Intermediate.	Union S. S. Co. of New Zealand.	do	300	
do.	do	Tasmania, Melbourne	do	do		
do.	Maheno	Pleasure Steamer, Lake	Turbine S. S. Co.	Swan & Hunter	260	33
1905	Victorian	Ontario	do	do		
do.	Carmania	Inter-Colonial.	Union S. S. Co. of New Zealand.	Denny	400	50
do.	New Cunarders	Atlantic Intermediate	Allan S. S. Co.	Workman & Clarke	540	60
do.	do	Service	do	do		
1904	Amethyst	Atlantic Mail	Cunard Co.	John Brown & Co.	678	72
do.	do	do	do	John Brown & Co.	760	88
1905	Lubeck	3d class cruiser	R. N.	Swan & Hunter	360	40
do.	Salem	do	German Navy	Armstrong		
do.	Chester	Scout Cruiser	do	Vulcan Co	341	43 3
do.	Dreadnought	do	U. S. N.	Bath Iron Works	420	46 8
do.	Orion class	Battleship	U. S. N.	Fal. River S. & B. Co.	420	46 8
do.	No. 243	Armored Cruiser	R. N.	Portsmouth Dockyard		
do.	Libellule	Experimental Torpedo	R. N.	do		
do.	Caroline	Boat	French Navy	Société des F. & C. Méditerranée		
1903	No. 203	do	do	do		
1904	No. 291	Torpedo Boat	do	Yarrow	152 6	15 3
1905	S. 125	do	do	Normand	125	14
1905	Revolution	do	do	do	125	14
		T. B. D.	German Navy	Schichau	200	23
		Experimental S. Y.	Curtis Marine Turbine Co.	do	178	17
					140 W. L.	

\*Rebuilt 1896.

In addition, two vessels for Great Central Railway Co., two for Boston and New York service, one for California Steam Packet Co., and various others.

\*Data contained in paper on "Marine Steam Turbine Development and Design," by E. M. Speakman, and read before the Society of Naval Architects.

## ITEMS OF GENERAL INTEREST.

The Wm. Skinner & Sons Dry Dock Co., and the Baltimore Ship Building & Dry Dock Co., of Baltimore, will be consolidated.

The Standard Oil Co. has awarded contract to the Harland & Wolff Co., Belfast, Ireland, for a tank steamer 496 ft. long and 60 ft. beam.

The passenger steamer City of Holland is in the Wolverine Dry Dock at Port Huron. She was badly pounded on the rocks and is in need of extensive repairs.

Moran Bros. Co., Seattle, Wash., have been awarded a contract to build a steamer 237 ft. long, 39 ft. beam and

17 ft. deep for the Pacific Coast Steamship Co., of San Francisco.

John L. Robbins Co., Erie Basin, Brooklyn, has been awarded the contract to repair seventy-four plates on the bottom of the steamship Britannia on its bid of \$19,750.

Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne, are stated to have received from the Donald Steamship Co. of New York contract for two steamers for the fruit trade.

It is estimated that the cost of repairing the steamer Frank Rockefeller which went on Isle Royale will be \$40,000. Forty-four plates will have to come off the bottom and twelve to fourteen off the stern.

# BUILT AND BUILDING.†

Depth.	Draught.	Speed.	Equivalent I. H. P.	No. of Shafts.	Screws per Shaft.	R. P. M.	Boiler Pressure.	Displacement.	Propeller Diam.	Remarks.
16 6	32	20.48	2,000	3	3	2,300	210	45	18	Only one screw now fitted to each shaft 28" diameter. Put in service July, 1901.
16 6 6	21.43		3,500	3	1 centre 2 wing.	505	150	700	4 9	
29 6 9	30.58		4,400	3	1	750	150	900	3 4	Put in service July, 1902. Very largely used for experimental trials.
36 7 3	50.2		13,000	4	2	1,080	240	390	3 4	Launched 6-9, '99. Ran ashore and lost during naval maneuvers in 1901. Trials made in 1900. Astern speed 15.5 knots.
29 7 3	27.1		10,000	4	3	1,180	240	450		Sank at sea in September, 1901.
43 8 3	26.2		7,000	4	1	900	240	440		Reciprocating cruising engines on inner shafts, 7½", 11" & 16" x 9" stroke. 400 R. P. M. Launched 1902
43 8 3	26		7,500	3	2	950	250	570		12 building.
43 8 3	26		3,600	3	1	1,200	220	225		3 building
43 8 3	33		15,000	3	1	700	220	800	6 0	Details unsettled Sept., 1905
43 8 3	36		28,000	4	1	600	250	1,500	7 0	One screw now fitted to each shaft. 3' 0" diameter.
43 8 3	25.36		2,200	3	3	1,200	225	145		†Yacht measurement.
94 13 0	18.02		3,800	3	1	550	180	1,400†	14 8	
86	15.0		1,400	3	1	700	150	900	4 0	
86	15.0		1,800	3	1	900	150	1,250†		†Thames yacht measurement.
86	14.5		1,250	3	1	550	160	782†		†Thames yacht measurement. Only twin screw Parsons installation.
46	18.0		4,000	3	1		150	1,800		
86	18.0		6,500	3	1		150	3,100		In process of conversion from paddle engines to turbine machinery. Vessel built about 1865.
5 11 0	21.73		8,500	3	1	480	150		6 0	Screws originally arranged as in King Edward.
12 9 0	21.5		6,000	3	1	500	150	1,200	5 7	Astern speed 13.0 knots.
46 10 0	20.7		6,500	3	1	480 c	150		5 0	Astern speed 12.5 knots.
56 10 6	22.3		7,000	3	1	510 w	150		5 0	Bow rudder fitted.
56 10 6	23.14		8,500	3	1	600	150		5 0	See McFay's paper, I. N. A., 1905.
56 10 6	23.53		9,500	3	1	750	200		6 2	do.
56 10 6	22.9		9,000	3	1	610	160		5 7	
46 9 3	21.75		6,500	3	1	430	160		6 6	Sister ship Invicta.
46 9 3	21.75		6,500	3	1	440	160		6 6	See <i>Engineering</i> , Aug. 18, 1905.
46 9 3	21.75		6,500	3	1	610 c	150	1,350	5 0	
46 9 3	21.75		6,500	3	1	630 w	150			
14 0	23		9,500	3	1	430	160			3 building.
33 13 6	24		10,000	3	1	440	160			2 sister ships.
9 10	20		6,000	2	1	650		2,000		Curtis turbines.
56	18		6,000	3	1		150			Sister ships Linka, Lunka, Lama. Designed speed 17.0 knots.
12 6	20.2		6,300	3	1	650	150	2,300	5 3	
9 9 6	19		3,500	3	1	650	160	1,100	4 1½	
36	19.5		12,000	3	1	275	160		8 3†	Sister ship Virginian, built by Stephens. †4 blades.
26 27 6	19.5		12,000	3	1	275	160		8 3†	
2 32	21.0		21,000	3	1	185	210		14 0	2 building
2 32	25.0		65,000	4	1	165	210			See <i>Engineering</i> , Nov. 18, 1904.
14 6	21.75 des.		9,800	3	1	450	250	3,000	6 6	Weight saved = 40 tons on engines + 25 on armored deck. Turbines made by Brown, Bowen A. G.
16 6	23.63 trial		14,000	4	1	490		3,200		
16 6	22.0 des.		10,000	4	1	650				
16 9	24.0		16,000	4	1	500	250		6 6	Curtis turbines.
16 9	24.0		16,000	4	1	500	250		6 6	
16 9	24.0		16,000	4	1	300	250	18,000	9 3	Details incomplete. 4 to build 1905-'06. Estimates
16 9	21.0		23,000	4	1	300	250	15,000	10 0	Rateau turbines. See trans. I. N. A., 1904.
16 9	24.0		28,000	4	1	300	250	15,000	10 0	
16 9	21.0		1,800	2	Various	1,800		92	Various	do
84 5 0	26.4		2,200	3	Various	575 R		140	do	Reciprocating engine on center shaft.
84 5 0	26.4		2,200	3	Various	280 T			do	
84 5 0	26.5		2,200	3	1		250	95		See <i>Engineering</i> , Aug. 5, 1904.
84 5 0	26.5		2,200	3	1		250	95		Brequet turbines. (Not yet tried.)
8 1	28.3		6,000	2	1	885		400	Various	Astern speed 16.7 knots (guarantee = 15.0).
7 0	18		1,800	2	1	650	250		4 6	Curtis turbines.

†Others are projected.

Architects and Marine Engineers.

Mr. Lafayette Lamb, of the Lamb Boat & Engine Co., Clinton, Iowa, will build a pleasure boat to take the place of the Wanderer recently sold to the Florida East Coast Railway Co. The new craft will cost about \$20,000.

All of the six barges which the Maryland Steel Co. contracted to build for the Panama Railroad Co. are in frame and some are entirely plated. When completed they will be knocked down and shipped to Colon via New York.

Hall Bros., Winslow, Wash., are building a steam schooner for Ira J. Harmon of San Francisco. The Fulton Iron Works of San Francisco will install the machinery.

The steam schooner Mayfair was launched recently

from the yard of John Lindstrom, Aberdeen, Wash. for Beele Bros. of San Francisco. She is 180 ft. long, 38 ft. beam and 12½ ft. deep.

Statistics at the Custom House at North Tonawanda show that lumber receipts at the two Tonawandas for the past season were 465,639,603 ft. compared with 409,970,341 ft. of last year, a gain of 55,162,262 ft.

The two big freighters building at the Union Iron Wks., San Francisco, for the American-Hawaiian Steamship Co., are making rapid progress. Good progress is also being made on the two new ferry steamers for the Key route. The wooden hulls for these ferries are being built at Dickie's yard.

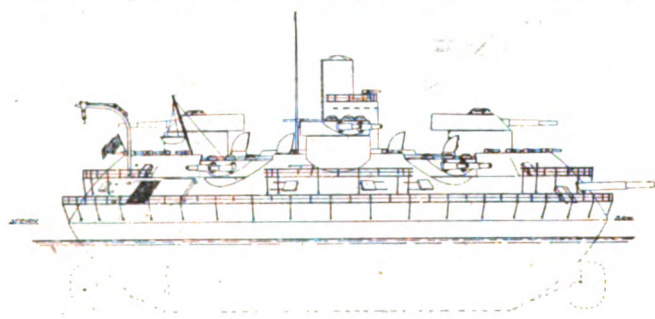


# Ultima--A Globuloid Naval Battery.\*

By Anson Phelps Stokes, Associate Member.

At the last annual meeting, I described plans for a semi-globular naval battery to be called the Cerberus; and I stated then, in the last appendix, that I was awaiting reports of experiments with a model of an improved Cerberus in the government model basin. The results of these experiments are shown in the present appendix in a letter dated March 31, 1905, and a chart dated March 25, 1905, from the bureau of construction and repair. Comparing these with the similar charts and the bureau's memorandum, printed in my paper in last year's transactions of this society, great and continual improvement is shown. In the appendix will also be found memorandum on performance of floating battery Ultima.

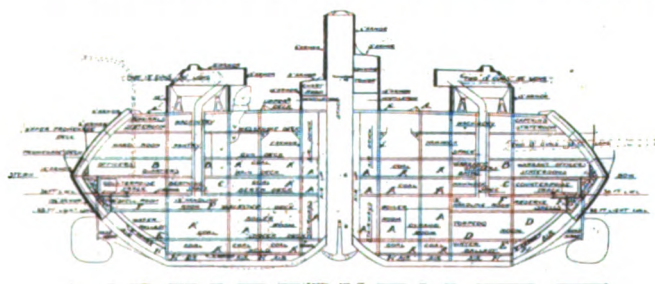
In these comparisons, it will be borne in mind that the lineal measurements of the models are 1-36 those of vessel, and that by Froude's law, the speed ratio is the square root



OUT-BOARD PROFILE.

of lineal ratio, and that the charts are on different scales and refer sometimes to vessel speed and sometimes to model speed. Attention is called to plate 15 where are plotted, on a uniform scale, the results as to speed and horsepower shown by these four charts, Plate 12 shows outlines of the four models experimented with.

To cure the instability of resistance and the tendency of



LONGITUDINAL SECTION.

model to dip forward, at certain speeds, shown in some of the experiments, when the model was started on even keel, I have increased the length of vessel 90 ft. with only 10 ft. increase of breadth, have placed the knuckle above the water-line, have given much inward slope to bow and stern below water, and have placed, at the bow, an additional rudder, as is usual in American ferry-boats.

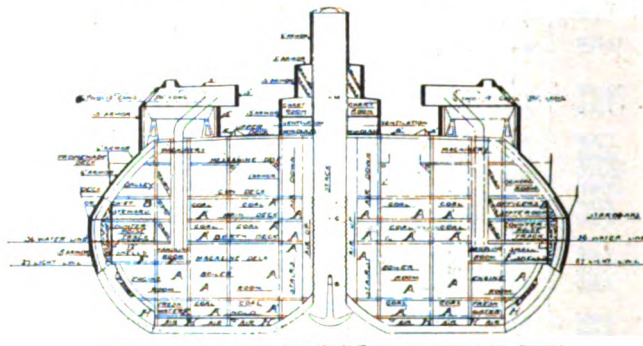
I call the proposed new naval battery the Ultima, the words Ultima Ratio used to be inscribed on some large guns.

The name is not intended to indicate that the battery is not capable of improvement. Indeed, since drawings were sent to the lithographers, I have thought of modifications. The results of trials of the model of the Ultima in the government model basin will be found in the appendix. Length, 270 ft. Breadth, 190 ft. Displacement at normal load 30,000 tons.

\*Paper read before Society of Naval Architects and Marine Engineers.

This includes 2,400 tons of coal, and 500 tons of fresh water. The fresh water tanks hold 980 tons. Displacement at light loads 22,300 tons. Draught at normal load 36 ft. At light load 28 ft. Freeboard with sliding doors at gun deck open 18 ft. measured perpendicularly. Freeboard with sliding doors at gun deck closed 24 ft. measured perpendicularly.

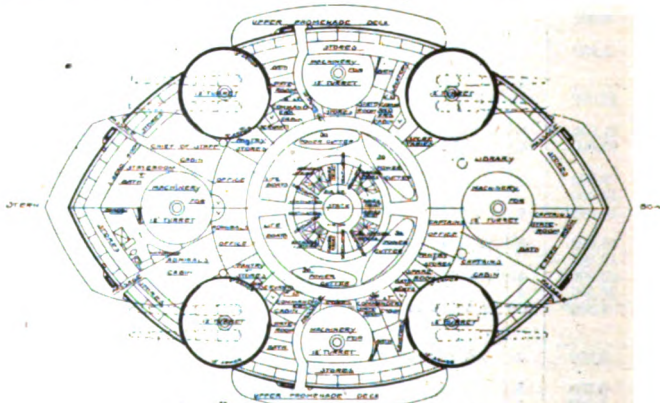
The coal bunkers have capacity for 2,600 tons more which



CROSS SECTION.

would sink the vessel an additional 2 ft. 6 in. The area of the normal being 34,913 sq. ft., which is 1,000 tons for one foot of displacement at load water line.

Indicated horsepower draft 10,000. With forced draft 14,000. Deducting 1,500 I. H. P. for ventilation, light, ice making, steering, augment of screws, etc., and obliquity of inner shafts, would leave 8,500 I. H. P., with natural draft, or say 12,000 with forced draft. This gives 4,500 E. H. P. for propulsion with natural draft or 6,300 E. H. P. with forced draft.



MEZZANINE DECK.

The chart, dated at navy yard, Washington, D. C., Nov. 6, 1905, too late to be printed herewith, but which will be found in the appendix in the proceedings, shows the Ultima's speed at the following draughts of vessels:

34 ft. with natural draft  $7\frac{7}{8}$  knots. With forced draft  $8\frac{3}{4}$  knots.

36 ft. with natural draft  $7\frac{1}{2}$  knots. With forced draft  $8\frac{3}{8}$  knots.

38 ft. with natural draft  $7\frac{3}{8}$  knots. With forced draft  $8\frac{1}{4}$  knots.

At 36 ft. draught of vessel and with natural draft at boilers the Ultima could steam as follows starting with the following quantities of coal: With 2,400 tons 11 days, 2,000 sea miles. With bunkers full, 5,000 tons 23 days, 4,200 sea miles.

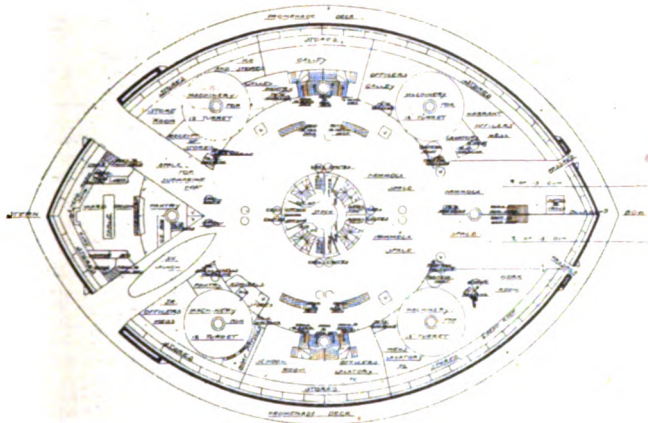
1,500 tons additional coal may be carried on gun deck and upper deck and in outside tanks which may be placed on sides above upper promenade deck. This would make in all 6,500



tons—a radius of over 5,000 sea miles. If starting for a long voyage as to the Pacific, additional coal might be stored in the counterpoise space. Not knowing much about water-tube boilers, I drew the plans for Scotch boilers, and have made them smaller and farther apart than necessary—not trying for great speed. There is, however, space enough in the boiler rooms for twenty-six water tube boilers, 9 ft. 6 in. x 11 ft. 6 in. Without increasing total weight this would increase H. P. 62 per cent at forced draft.

Making speed at 36 ft. draught of vessel: With natural draft at boiler  $8\frac{1}{4}$  knots. With forced draft at boilers  $9\frac{1}{2}$  knots.

Main battery, two 15 in. B. L. guns 60 cal., and sixteen 12 in. B. L. guns 50 cal. These 12 in. guns are heavier, longer and more powerful than 12 in. guns now in use, 16 in. guns may be used instead of the 15 in. I have estimated

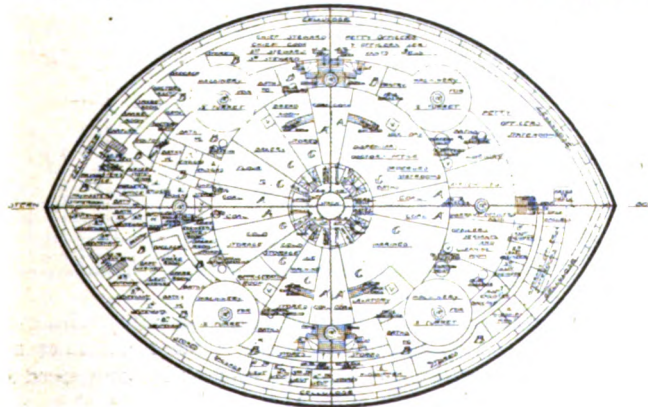


GUN DECK.

the weight of the 5 in. guns at 135 tons each which is the weight of the 16 in. gun at Sandy Hook.

There are also 20 3 in. guns on upper deck, two on top of chart room and two on top of conning tower, and a number of machine guns and smaller guns.

The two 15 in. guns 60 caliber are elevated by shifting center of gravity of whole vessel, and their azimuths are regulated

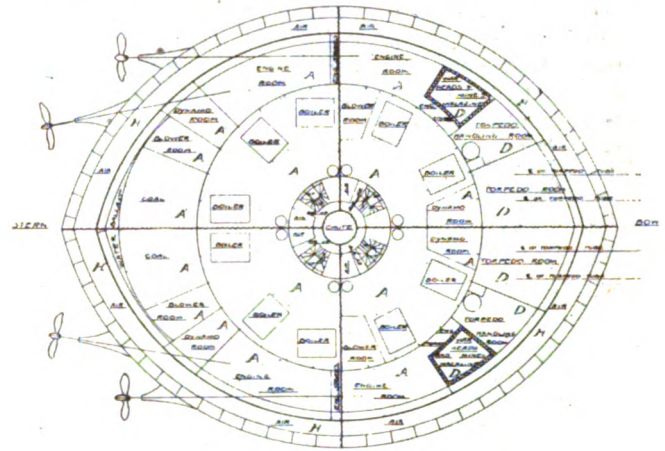


BERTH DECK

by revolving the vessel. They have a very flat trajectory, and would not have to be elevated more than three degrees beyond their initial elevation of say three degrees, except when operating at very great range, as in attacks on some fortified places. These 15 in. guns can be made much longer and heavier in chambers and chases than if they were mounted on trunnions, for very large and long guns when on trunnions are found to droop at the muzzle. They could destroy existing battle ships before the latter could get near enough to use their 12 in. 40 caliber guns. The 12 in. guns on Ultima are not only very much more powerful than any guns on any existing battleship, but she has many more 12 in. guns as shown on plate

4. Of the Ultima's 16 12 in. guns ten can be trained directly forward or on either broadside at the same time, and these are all 50 caliber. The Connecticut has only two 12 in. guns that can be trained directly forward at the same time and these are 40 caliber. Even if the 15 in. guns were omitted, if no other guns were to take their place on gun deck, the Ultima would be more than four times as powerful as any existing battleship.

The two counterpoises, 400 tons each have together sufficient



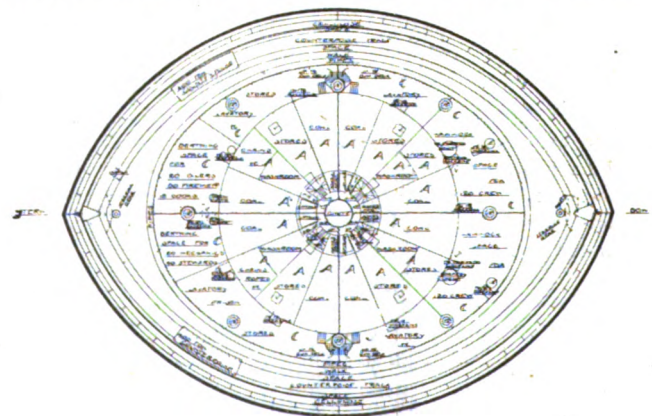
LOWER DECK.

weight, when moved from right forward to right aft, to elevate these guns  $3^\circ$  above their initial elevation of  $3^\circ$  making  $6^\circ$  in all. For further elevation, water ballast can be used. The sides of the Ultima present a small effective target, being about one-half the length of the latest battleships. This shortness and the obliquity of the inner shafts, the distance apart of the outer shafts and the additional rudder give great "maneuverability." The rudders contain 350 sq. ft. each.

The 12 in. guns are all mounted in turrets, two guns in each. It will be seen that the fire of each gun covers a large arc. Especially is this so regarding the guns in upper turrets where the eight 12 in. guns are 57 ft. above load water line. This altitude gives immense advantage not only in plunging fire but in freedom from spray on sights. The eight 12 in. guns in the turrets on mezzanine deck are 35 ft. above load water line. The Connecticut's upper turret guns are 25 ft. above load water line.

There are four submarine torpedo tubes forward on lower deck. Additional tubes can be placed aft on mezzanine deck.

The armor is as follows: Krupp's cemented steel,  $13\frac{1}{2}$  in. on main belt averages 25 ft. wide all around vessel, and completely covers sides of berth and magazine decks. 12 in. on



MAIN DECK.

sides between main belt and gun deck; 6 in. on sides above gun deck and on stack; 4 in. on upper deck, and on the protective circular bulkhead there, and on bulwarks, and on tops and backs of mezzanine deck turrets; 2 ft. on sides below belt.

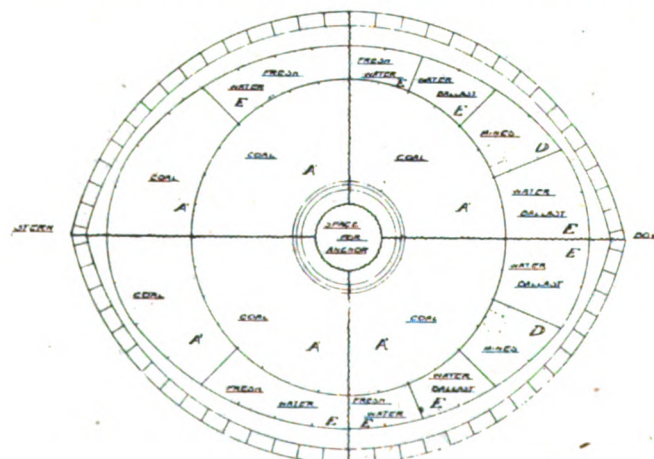


This is placed 8 ft. in board, or 12 ft. measured horizontally, and may be placed farther in board; 3 in. on tops of tower and tops of upper turrets; 15 in. on sides of tower, barbettes



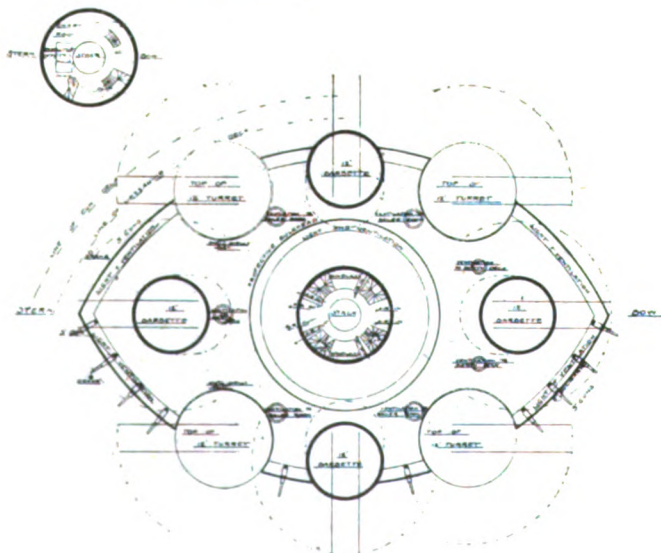
MAGAZINE DECK.

and turrets above upper deck, and on exposed 2-3 of mezzanine deck turrets; 2 in. on bulkhead between 15 in. guns and on under side of hold deck; 1 in. on berth deck, on coffer-dams,



HOLD.

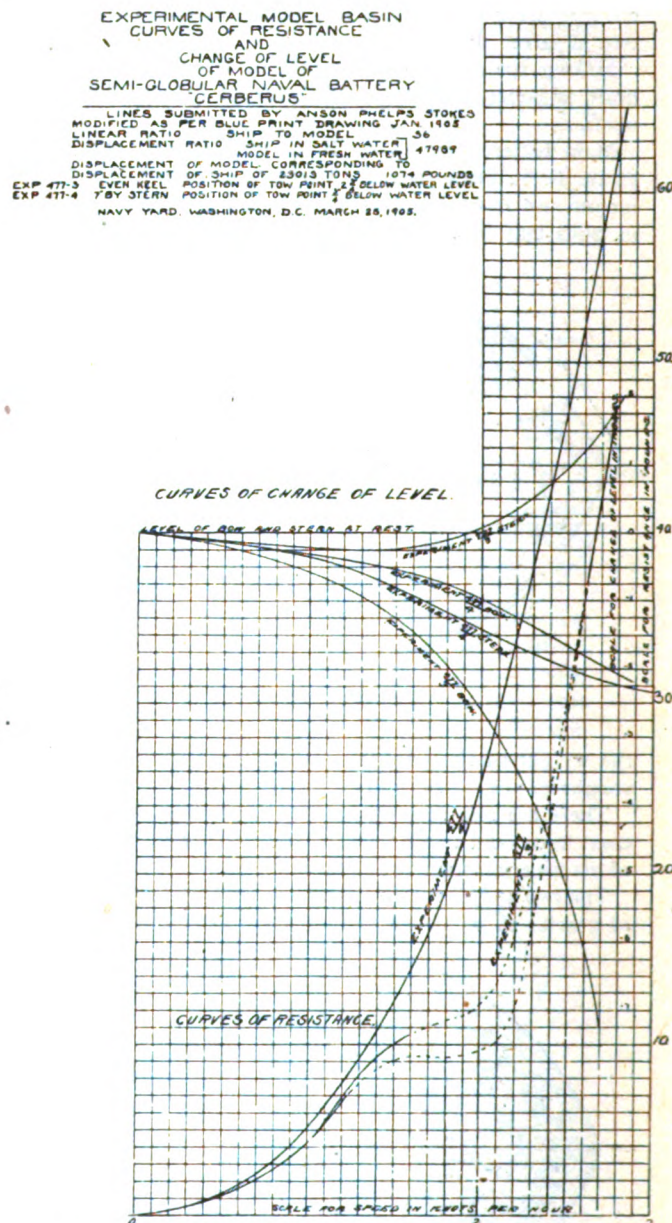
and on tower from upper deck to berth deck. 2½ in. on vertical central tube below stack armor (this last mentioned armor does not show in drawings).



UPPER DECK.

The above represents correctly the total weight of armor. But the armor is a little thicker in some places, and a little

thinner at other places. The sides being so sloping and the battery capable of operating at such long range, the armor gives very much better protection than even heavier armor would on any existing battleship. Thus, at bow and stern, the 13½ in. armor on main belt measures 17 in. horizontally, and, there is the very important fact that, because of its great inward



slope downward and its circular shape horizontally, shells, etc., would glance, and besides this, there is the 1 in. armor on coffer dams. The amount of armor needed for protection of upper sides and upper deck together is much reduced by the great tumble home.

Including the late Eastern war, there is no recorded case of 6 in. Krupp armor on a battleship being pierced. But if it be thought best to increase side armor above gun deck, this can readily be done. Each 1 in. would add 257 tons and would increase draught 3 in. Future naval battles may probably be at ranges exceeding 5 miles.

The following boats may be carried under the armor protection: One 63 ft. submarine. One 50 ft. launch. Two 36 ft. power cutters. Two 30 ft. power cutters, and a number of smaller boats, including life boats. There is a vertical central tube, the upper part of which is a smoke stack, while the bottom widens out to form a space for a mushroom anchor. The starboard and port shafts may be extended so as to be



arranged for forward screws also, if desired. The arrangement of coal bunkers gives great facility for coaling and affords excellent opportunity for ventilation pipes and other pipes to pass to all parts. A watertight compartment occupies the outer part of berth deck. It contains clogged tracks on which are moved weights to tilt the vessel. Water ballast may also be used for this purpose. It also contains steering apparatus at low and at stern, and has on the inboard side, pipes for water, steam, air and electricity going to all parts of the vessel, also sewage and drainage pipes. It is accessible only by ladders in water-tight trunks extending above the gun deck.

All space below gun deck, except the central tube and the counterpoise compartment, is divided into four equal main divisions. The main divisions are separated by watertight bulkheads, and floors shown by wavy (~~~~~) lines. All these main divisions are carried up to gun deck. Each of these main divisions has a complete outfit of boilers, engines, coal, stores, water, ammunition, pumps, and other machinery, including means of propulsion, and the movement of its own turrets, etc. The machinery for pumping, ventilation, electricity, water distilling, etc., in each main division is available and sufficient for the whole vessel. The steering gear is protected by the 13½ in. sloping belt armor, and by the 1 in. armor placed 11 ft. inboard on coffer dams. Each main division has watertight subdivisions distinguished by open faced letters.

Subdivisions A contain all the space below gun deck inside of tower except central tube, all the space on lower deck outside of tower, except water ballast tanks and torpedo spaces and air tanks and coal bunkers, all the space on berth deck between tower and main circular bulkhead, excepting coal bunkers, all the space on magazine deck, between tower and main circular bulkhead, excepting coal bunkers.

Subdivisions A' contain all the coal bunkers. Subdivisions B contain all the space on main deck outside of main circular bulkhead. Subdivisions C contain all the space on berth deck between main circular bulkhead and elliptical bulkhead. Subdivisions D contain the torpedo spaces on lower deck and the mines' cells in hold. Subdivisions E contain tanks for fresh water and water ballast. Subdivisions F contain all the space on magazine deck outside of main circular bulkhead. Subdivisions have each a number of watertight compartments, any of which can be promptly flooded. Subdivisions G contain all the space on main deck between tower and main circular bulkhead, excepting the coal bunkers. Subdivisions H contain on lower deck, on hold deck and below hold, air tanks for defense against torpedoes and mines. These tanks may also be used for water ballast.

Some of the subdivisions are still further divided into watertight compartments with watertight doors which latter may be used on occasion, such as to shut off certain compartments for coal and stores, but are not depended on for safety. Reliance is placed on the always non-communicating watertight main divisions and subdivisions, and upon the watertight bulkheads and floors with watertight man-holes which separate the boiler rooms from the coal bunkers; for these man-holes are made to be screwed tight and are very seldom used, probably not more than once on a voyage. In any main division, so long as there is coal in bunkers above lower deck, the watertight man-holes to all other bunkers would remain screwed tight; and so long as the bunkers between the elliptical and the main circular bulkhead are being used, the watertight man-holes to all other bunkers remain screwed tight; and so long as the bunkers below lower deck between the main circular bulkhead and the tower are being used, the watertight man-holes to all other bunkers remain screwed tight. So that the amount of coal

bunker space below gun deck communicating with any A subdivision at any one time would never exceed 25,000 cubic feet.

With this system of watertight main divisions, subdivisions, compartments and coal bunkers, and of counterpoises, and with large tanks for water ballast, if a number of subdivisions and compartments were filled with water, the battery could still be kept afloat and on an even keel, and could continue to maneuver and fight as a complete vessel, for she is practically four armored vessels in one.

Cubic contents below gun deck:

A.—In each forward main division, 63,800	cu. ft. × 2.....	=127,600 cu. ft.
A.—In each after main division, 69,000	cu. ft. × 2.....	=138,000 cu. ft.
A'—In each forward main division, 38,500	cu. ft. × 2.....	= 77,000 cu. ft.
A'—In each after main division, 67,600	cu. ft. × 2.....	=135,200 cu. ft.
B.—In each main division.....	48,600	
	cu. ft. × 4.....	=194,400 cu. ft.
C.—In each main division.....	18,700	
	cu. ft. × 4.....	= 74,800 cu. ft.
D.—In each forward main division, 33,900	cu. ft. × 2.....	= 67,800 cu. ft.
E.—In each forward main division, 12,000	cu. ft. × 2.....	= 24,000 cu. ft.
E.—In each after main division, 5,650	cu. ft. × 2.....	= 11,300 cu. ft.
F.—In each main division.....	38,600	
	cu. ft. × 4.....	=154,400 cu. ft.
G.—In each main division.....	14,750	
	cu. ft. × 4.....	=59,000 cu. ft.
H.—In each forward main division, 94,200	cu. ft. × 4.....	=376,800 cu. ft.
Counterpoise space.....		96,800 cu. ft.
Armor and backing, and the steel construction, cellulose, etc., contain below gun deck.....		396,800 cu. ft.

Total.....1,718,500 cu. ft.

This equals 49,000 tons, which would be the total displacement if the vessel were submerged up to gun deck. But she may be submerged more than this, for the sliding doors are made watertight.

The reserve buoyancy in zone between gun deck and load water line is 636,768 cubic feet. When the four sliding doors on gun deck are closed, the reserve buoyancy is 822,744 cubic feet.

There are hatchways 5 ft. square for light and ventilation six feet perpendicularly above gun deck. These hatchways are placed in ward room, galley, etc., and are protected by armor sliding hatches. Some similar hatchways are on mezzanine deck where are also 6 armor sliding doors 4 ft. wide. Much ventilation to main deck comes from under seats on gun deck. These seats are not shown in drawings. Any port holes on main deck would be covered with armor grating.

The ward-room officers' rooms are about twice as large as usual and can, of course, be reduced in size if this be necessary or be considered best. But I suppose it to be for the good of the service to make quarters comfortable and attractive, and that these officers have space for good desks, sofas etc., and have facilities for study and for drafting. If these facilities were better on existing battleships we might have a larger number of papers from officers at sea. The plans show accommodation on board for over 1,500, including all officers, crew and marines.

Under the promenade deck, there may be numerous triangular tanks for the safe storage of oil outside the vessel.

The bottom and sides below load water line are sheathed and coppered. Protection against torpedoes and mines is afforded by the air spaces all around lower deck and hold deck and under the hold, and by the 2 in. armor on the inboard sides of all these air spaces. Numerous cranes and

derricks and davits are omitted from the drawings for clearness. Summaries of weights and moments, etc., will be found in appendix.

The Ultima would be a very steady gun platform as it would occupy a large part of the wave slope or slopes, and have always a very flat effective wave slope. She has great metacentric height and large fresh water tanks and water ballast tanks. Some of these when partly filled, could be arranged as "water chambers" to have an "extinctive effect," tending to counteract the wave motion. The counterpoises could also be used for this purpose. See Manual of Naval Architecture by Sir William H. White, K. C. B., LL.D., etc., pages 182, 257, 229, etc. Also Transactions of the Institution of Naval Architects, Vol. XXII, 1881, where the performances of the wide and shallow Imperial yacht Livadia are discussed.

Sir William took much interest in that vessel and said she was "a marvellously steady, well-behaved ship." Capt. Goulaeff, who was an old pupil of his, "showed him everything" while building, and Sir William says, "I looked through all the results of the experiments made by Dr. Tide-man on the resistance of models of the Livadia. Sir E. J. Reed, K. C. B., F. R. S., etc, who was on her in a severe gale spoke of her "unprecedented steadiness." This was fully endorsed by Admiral Sir Houston Stewart.

October 17, 1905.

SUMMARY OF WEIGHTS AND MOMENTS.

Items.	Weight, Tons.	Levers.		Moments.	
		Above.	Below.	Above.	Below.
Armor .....	15.484	18.1	.....	280,025	.....
Guns .....	1.522	48.0	.....	73,100	.....
Steel construction ..	4.846	.....	.7	.....	3,392
Machinery .....	1.115	.....	15.0	.....	16,720
Equipment .....	225	.....	15.5	.....	3,488
Carpenter and joiner work .....	325	7.5	.....	2,438	.....
Ammunition .....	900	.....	7.0	.....	6,300
Outfit .....	500	5.0	.....	2,500	.....
Stores .....	400	5.5	.....	2,200	.....
Fresh water .....	500	.....	27.0	.....	13,500
Coal .....	2,400	.....	14.0	.....	33,600
Packing and cellulose .....	1,025	3.0	.....	3,075	.....
Counterpoises .....	800	3.5	.....	2,800	.....
	30,042			366,138	77,000
				77,000	

30,042 ) 289,138

C. G. = 9' 6" above 36'  
L. W. L.

October 17, 1905.

FOR LIGHT LOAD. WEIGHTS TAKEN OUT.

Item.	Weight in tons.
Guns .....	1,200
Counterpoises .....	800
Ammunition .....	900
Coal .....	2,400
Outfit and equipment .....	725
Stores .....	400
Fresh water .....	500
Machinery .....	800
	7,725

30,042 tons at deep load.  
7,725 tons.

22,317 tons at light load.  
from displacement sheet  
Light draught = 28' 6".

Sir William's kindness, advice and encouragement to men less experienced than himself in naval architecture and facing difficult problems, is well known to many in this hall. I recall with much pleasure my conversations with him, and that at his suggestion, and upon his nomination, I was elected an associate of the Institution of Naval Architects.

As to the purposes for which my battery or battleship is especially designed, and suggestions regarding the greater importance of gun powder than of speed, and of more power rather than more numerous battleships for the protection of our coasts, and of our officers and men in battle, I must refer to my paper in the last volume of our Transactions.

Ships can be built abroad in much less time than we require, and it is necessary for us to take a decided leap ahead if we would not build battleships that are antiquated and outclassed before they are ready for sea. The building of a 30,000-ton Ultima here would be very discouraging to foreign competition.

When in response to your invitation, I had agreed to prepare my last year's paper, I found the subject rather large for my amateur abilities and for the time at my disposal. I am glad to have an opportunity now to put the matter in, to me at least, a more satisfactory shape, and I wish to add my testimony to the indispensable advantages of tests in the government model basin, and to the courtesy of the naval authorities.

I am a man of peace. Some friends have criticised my designing a war vessel. Study of the subject has convinced me that nothing we can do will so conduce to peace, as, while seeking to avoid foreign complications, providing adequately for our own defense. St Paul says, that if any provideth not for his own, he is worse than an infidel.

A friend sent me from Paris, a newspaper clipping, in which, with the kindly meant and magnificent exaggeration characteristic of modern journalism, I was described as a great philanthropist and great inventor. My friend's letter consisted of the following lines:

"Dear Mr. Stokes, is it a hoax?  
Or have you found some balm for fighting?  
Some Batteree, Philanthropee,  
Some virtuous kind of dynamiting!"

APPENDIX.

Washington, D. C., March 31, 1905.

Subject: (A) Experiments at Model Basin with modified model of Cerberus, invention of Anson Phelps Stokes.

Sir: I. Referring to your communication of January 30, 1905, forwarding modified shape of your Cerberus with the request that experiments be made at the Experimental Model Basin with the modified shape, the Bureau forwards you, under separate cover, tracing and two prints showing the results of experiments upon the model as modified. For a portion of the curve which refers to the model originally upon an even keel, there was instability of resistance, as indicated by the shaded area. Throughout this range of speed, there was a very pronounced eddy upon one quarter or the other of the model and a strong athwartship current flowing past the stern towards this eddy. The vessel would be entirely unmanageable under these conditions.

Very respectfully,

(Signed) W. L. CAPPS.

Chief Constructor, U. S. N., Chief of Bureau.

MEMORANDUM ON PERFORMANCE OF FLOATING BATTERY ULTIMA.

The model was made 1-36 size and was tested with the same apparatus used in testing models of the Cerberus. At all speeds tested the model showed much disturbed and eddying water aft, but not so much as in the case of the Cerberus. The broken water was also very stable in position, remaining right aft. There were no athwartship and erratic movements of any large amount of water across the stern, as was the case with the Cerberus.

The eddying did not interfere with the readings of the dynamometer measuring the resistance.

The change of trim of the Ultima was very slight throughout the range of speed tested, but there was considerable bodily settlement.

The model was tested without rudders. Diagram herewith shows the amount of settlement of the model in inches.

## AROUND THE GREAT LAKES.

The grand lodge of the Ship Masters' Association will meet in Buffalo next week.

The annual meeting of the Lake Carriers' Association will be held at Detroit on Jan. 11.

The Lumber Carriers' Association will also meet during the same week.

Mr. G. A. Tomlinson, of Duluth, has been made an honorary member of the Cleveland Ship Masters' Association.

The annual meeting of the Marine Engineers' Beneficial Association will occur in Washington about the middle of January.

The Industrial Iron Works, Bay City, Mich., has received an order from the American Ship Building Co., for a new 10-ton steam crane.

The fire boat Protector, for the Chicago water front, was launched from the yard of the Empire Ship Building Co., Buffalo, on Saturday last.

The total coal receipts by lake at Milwaukee last year were 2,819,841 tons, of which 800,983 tons were anthracite and 2,018,858 were bituminous.

A revised chart in colors of Lake Superior, No. 2 has just been issued by the United States lake survey office, and is for sale by the *Marine Review*.

A revised chart in colors of the harbor of refuge, Sandy Beach, Lake Huron, has just been issued by the United States lake survey, and is for sale by the *Marine Review*.

Superintendent Joseph Ripley, of Sault Ste Marie, has returned from Washington after several months' work on the board of consulting engineers for the Panama canal.

A new chart in colors about the head of Green Bay, including Fox river below, Depere, Wis., has just been issued by the United States Lake Survey, and is for sale by the *Marine Review*.

The secretary of agriculture has sent a recommendation to congress urging an appropriation of \$22,000 for the purpose of establishing a warning station on Devil's Island, Lake Superior.

The Detroit Shipbuilding Co. is fitting up rooms on the third floor of the plant for its new pointer shop and will also add a paint shop. Mr. Edward H. Rogers will have charge of the shop.

The coal chartering for next season is quite brisk at Buffalo. Shippers are in the market to load and hold until the opening of navigation, and they are paying fifteen cents above the usual rate.

A revised chart in colors, coast chart No. 7, Lake Michigan, showing East coast from Grand Haven to South Haven, Mich., has been issued by the United States lake survey office and is for sale by the *Marine Review*.

The dredging was continued in Buffalo river throughout November. The outer channel now has a width of from 200 to 280 ft. for a distance of 2,200 ft. outward from the outer end of the north pier, with a depth of 23 ft.

Whitney Bros., of Duluth, who have the contract for removing the coal cargo of the stranded steamer George Spencer at Thomasville, have succeeded in removing the better part of it and report that the boat is in pretty good shape.

The steamer Eastland, belonging to the fleet of the Michigan Steamship Co., was sold last week under the auctioneer's hammer to Robert R. Blacker, one of the heavy stockholders in the company. The price paid was \$100,000.

The first meeting of the Cleveland lodge of the Ship Master's Association was held last week. The annual meeting will occur on Friday of the present week. The local lodge has recommended that gas buoys be placed

at both entrances of Grand Island harbor of refuge on Lake Superior.

The fog signal station at Superior was partly wrecked by the recent storm on that lake. This station was constructed of heavy two-inch planking sheathed inside and out with iron, which was curled up on the sides like loosened wall paper.

## PERSONAL.

Capt. Thomas Donnelly, of Kingston, Ont., has been invited by the Dominion government to deliver a series of lectures during the winter, on the subject of lake navigation. A large attendance of Canadian steamboat men is anticipated.

## OBITUARY.

William R. Patterson, of Manistee, one of the best-known marine engineers, died at his home last week.

Captain A. Thompson, of the steamer F. A. Kilbourne, has been found guilty of negligence by Local Inspectors Bolles and Bulger, and his license as master suspended for the period of six months. Second Mate R. E. Jacobson was exonerated from blame. The Steamer F. A. Kilbourne stranded on Coos Bay bar on the morning of Sept. 8, and was damaged to the extent of \$6,000. No lives were lost. Capt. Thompson was blamed for steering so close to land, and for not taking the necessary precautions to sound, when he saw how near his vessel was to the shore.

The dry dock at Port Florence on the Victoria Nianza, which was completed in September, affords an interesting example in the progress of civilization in the dock company. This lake is now navigated by a considerable fleet of vessels owned by the Uganda Railway, and the dock was constructed for the upkeep of the boats. It is a small affair cut in rocks by natives who had never before done any serious work. It is 250 ft. long, 48 ft. wide and 14 ft. deep, and is probably the highest dry dock in the world, being located in an elevation of 3,700 ft. above the sea level.

The San Francisco customs department have just been notified by Victor H. Metcalf, Secretary of Labor and Commerce, that hereafter freight vessels shall not be allowed to carry passengers without a passenger's certificate. This rule includes agents and employes of the vessel, whether carried free, or for hire. The ruling has an important bearing on the shipping of San Francisco.

Bids for repairing the steamer Roanoke which struck on the Humboldt bar were opened recently and the work was awarded to Moore & Scott on their bid of \$12,500. The other bidders were: Union Iron Works, \$13,990; Risdon Iron Works, \$14,080; W. A. Boole & Sons, \$14,190; United Engineering Works, \$14,852, all of San Francisco.

It is understood that Secretary Bonaparte of the navy department will only recommend to Congress the construction of one new battleship. The general board has recommended three. There is a possibility that the South Carolina and Michigan, two battleships authorized last year but not yet constructed, will be increased in displacement from 16,000 to 18,000 tons.

## WANTED,

## Three Lake Schooners

Rated not less than A2 capacity, 1400 to 1600 gross tons on thirteen feet draft. Give number and size of hatches with distance between centers. Address

**Pentecost Lumber Co.,**  
Cape Vincent, N. Y.



## TRADE NOTES.

Andrew J. Morse & Son, 140 Congress street, Boston, Mass., report that they have unusual number of orders on hand for their diving apparatus, which is regarded as the standard for this purpose.

Elisha Webb & Son, Water and Chestnut streets, Philadelphia, Pa., have sent to their customers a pretty Christmas greeting consisting of a calendar illumined with a holly wreath in the three color process.

Falls Hollow iron manufactured by the Falls Hollow Stay-bolt Co., Cuyahoga Falls, O., has been specified for a number of locomotives recently ordered from the Baldwin Locomotive Works by the Seoul Fusan railroad of Japan.

The Bard union, manufactured by the Bard Union Manufacturing Co., Norwich, Conn., has been on the market a little less than two years, but the demand for Bard unions and flanges has grown to large proportions. A catalogue descriptive of these products will be sent upon application.

The Diamond flue blower manufactured by the Power Specialty Co., Detroit, Mich., is an invaluable little instrument in an engine room. By reason of its position at the rear of the boiler and working with a natural draft, the Diamond blower is the quickest, cheapest and most simple device for cleaning flues. It will clean all tubes their entire length in five minutes.

The Independent Pneumatic Tool Co., First National Bank building, Chicago, has opened an office at No. 207 Germania Bank building, Pittsburg, at which place they will carry a complete line of Thor piston air drills, reaming, tapping and wood-boring machines and pneumatic hammers. Mr. Richard D. Hurley has been appointed manager of the office. Mr. James C. Dennis will travel for the company out of New York.

Mr. C. S. Powell, general agent of the Westinghouse Electric & Mfg. Co., who has for some time occupied office at 11 Pine street, New York, has removed to the offices of the company on the 10th floor of the Trinity building, 111 Broadway. The Westinghouse Electric & Mfg. Co., in addition to their offices in the Hanover building at 11 Pine street, occupy the entire 10th floor of the Trinity building.

That the Roberts boiler is as popular abroad as it is at home, is shown by the fact that the manufacturers of this well known type have just shipped five boilers to Messrs. James Beggs & Co., for export, another to the Buchholtz reversible turbine syndicate, England, one to Chili for the Chilian schoolship, one to A. Ahlstrom, Finland as well as one to Mr. Charles Lobner, Nicaragua, one to A. P. McLaurin, Nipe Bay, Cuba; and another is now being shipped from their works to South Africa for the Marralls Machinery Co.

The Ashton Valve Co., 271 Franklin street, Boston, Mass., makers of the Ashton high grade pop valves and gauges, have just issued a beautiful calendar representing a scene in Holland extremely characteristic and amusing. The company is distributing it with its compliments to all friends in the engineering fraternity and trade in general. The company has found it necessary, however, from past experience in order to protect itself, to make a nominal charge of 15 cents for the calendar in order to partly cover cost of postage.

The Independent Pneumatic Tool Co., 1255 First National Bank building, Chicago, states that they had a very large increase in business during the month of October for Thor pneumatic tools and appliances from all parts of the world. One cable order received a few days ago from a concern in England included 200 Thor piston air drills, reversible wood-boring machines and pneumatic riveting and chipping hammers of various sizes. They also report a good demand for pneumatic tools from railroads and industrial works throughout the country. The company

intends to enlarge its plant at Aurora, Ill., and is now purchasing a large amount of new machinery to install in it.

The Leonard sofa bed is a most luxurious adjunct to the modern steamer. It is an especially serviceable thing for the parlor in the passenger end of the modern lake freighter because it can be so readily converted into a full sized bed and thus provided for the accommodations of passengers in excess of the ordinary stateroom capacity. In the day time it can be made into a most ornamental davenport, adding materially to finish of the room. It is provided with a fine hair mattress and also contains a large drawer for putting away blankets and sheets. It is manufactured by the New Leonard Sofa Bed Co., 305 Cedar ave., Cleveland, O.

The Barcus-Hallam Co., 111 Fifth Ave., New York, are manufacturers of an automatic life boat handler of more than usual efficiency. It has been installed on the steamers of the Fall River and Old Dominion lines on the coast as well as on vessels of the Cleveland & Buffalo Transit Co., and the Goodrich Line on the lakes. It is also being introduced on army transports. The device consists of a style of winch attached to each davit with single purchase blocks and wire rope falls. A test was made on board the transport Summer with one of the transport's big life boats which weighs 3,000 lbs. and which can safely float forty-seven persons. The automatic boat handlers operated by two men at each end of the boat raised the boat out of the chocks and swung her outboard ready for floating in just twenty-two seconds, after which she was swung out and lowered to the water alongside the ship, a distance of 50 ft., in fifty-eight seconds, one man at each end doing the lowering away with the friction band around the barrel of the winch.

It is announced from London that the "Long-Arm" System Co. of Cleveland, Ohio, has been awarded a gold medal for its Earl's Court exhibit of "Long-Arm" electrically operated power doors for ships. This was one of the few displays of American devices in the naval, shipping and fisheries exhibit. The exhibit of this system, by which bulkhead doors are closed from a central station in time of an emergency, has attracted the favorable attention of many European naval experts. Foreign admiralities are investigating it with a view to its adoption, following the example of the American navy, which has installed the "Long-Arm" system on thirty-two of our ships. The development of automatic bulkhead doors has been effected wholly within the United States navy. Francis T. Bowles, formerly chief constructor, first conceived the idea of an electrical apparatus for operating these doors. Another graduate of the Naval Academy, W. B. Cowles, perfected Admiral Bowles's idea into the practical system now in use.

The Water Light Co., 305 West Fayette street, Baltimore, Md., are manufacturers of a light which is extremely serviceable for railroads and shipowners. The Water light is the smallest and most powerful self-contained light in the market. In design it is attractive, consisting of a charged metal cylinder made of tin, copper, brass or steel. There exists no mechanism or moving parts to get out of order. The light can easily be put into commission within thirty seconds. It is non-explosive, self-igniting, unaffected by heat, cold, percussion or friction. In fogs or mists it is the most penetrating light yet devised and is made in any size or capacity from 300 candle power to 2,000 candle power. The cost is represented to be less than any other lighting system. It has been adopted by the following steamship companies: Caledonian Steamship Co., New Zealand Shipping Co., Orient Pacific Steam Navigation Co., Peninsular Oriental Steam Navigation Co., Trans-Atlantic Steam Navigation Co., Houlder Bros. Co., Royal Mail Steamship Co., Wymouth Steam Packet Co., The Campbell Line.





VOL. XXXII.

CLEVELAND, DECEMBER 28, 1905.

No. 26.

## Steamship Bonds

**We offer for spring delivery at par and accrued interest:**

**\$160,000**

First mortgage 5% bonds (maturities 1 to 10 years) on vessel of about 10,000 tons capacity being built by the Great Lakes Engineering Co., Detroit, Mich., at contract price of about \$360,000.

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First mortgage 5% bonds (maturities 1 to 10 years) on vessel of about 10,000 tons capacity being built by the American Ship Building Co., Cleveland, Ohio, at contract price of \$450,000.

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First mortgage 5% bonds (maturities 1 to 10 years) on vessel of about 8,000 tons capacity being built by the American Ship Building Co., Cleveland, Ohio, at contract price of \$300,000.

### INTERIM 5% CERTIFICATES

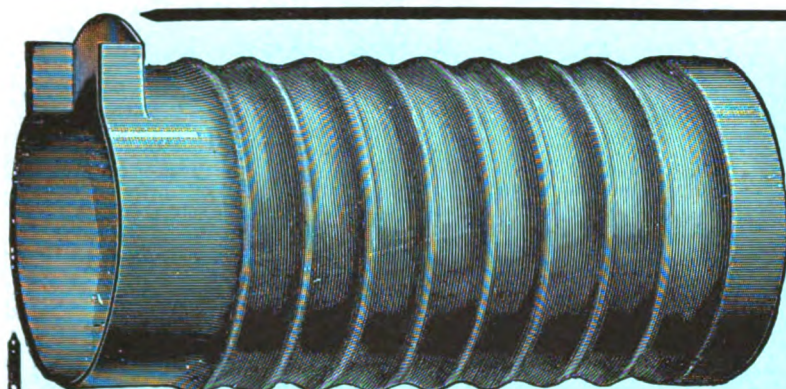
Pending delivery of above bonds, we will issue our temporary certificates bearing interest at the rate of 5% per annum exchangeable for bonds when issued.

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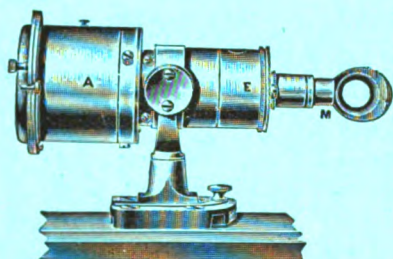
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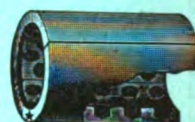
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12 Pockets.

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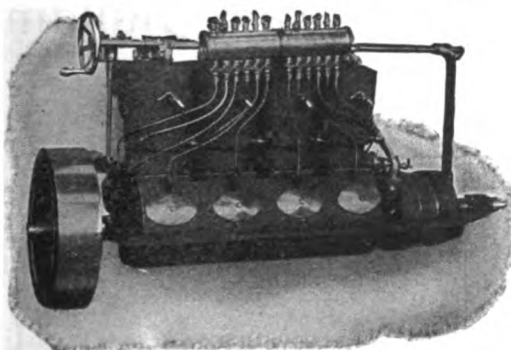
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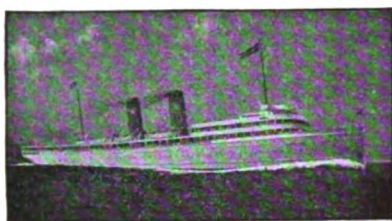
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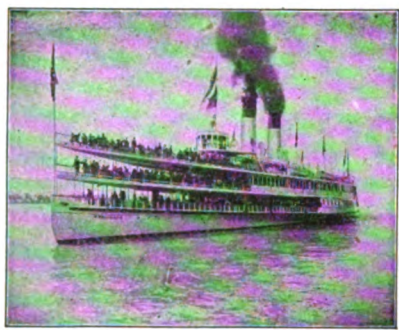
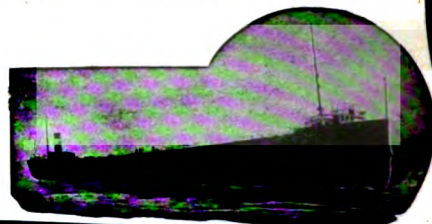
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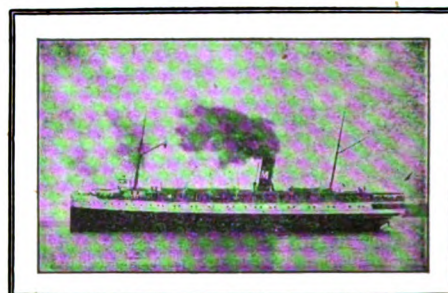
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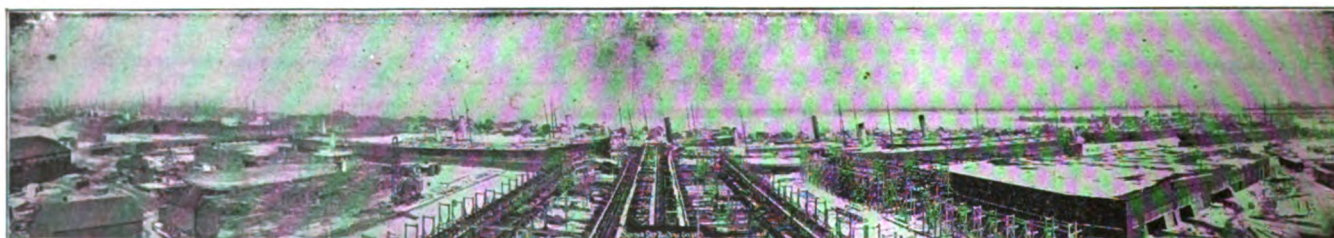


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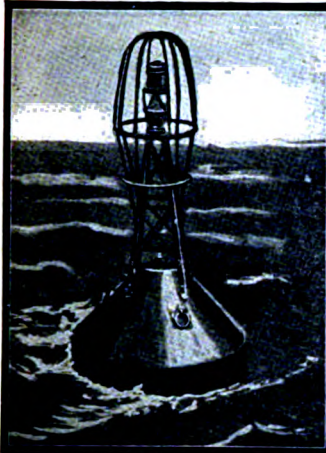
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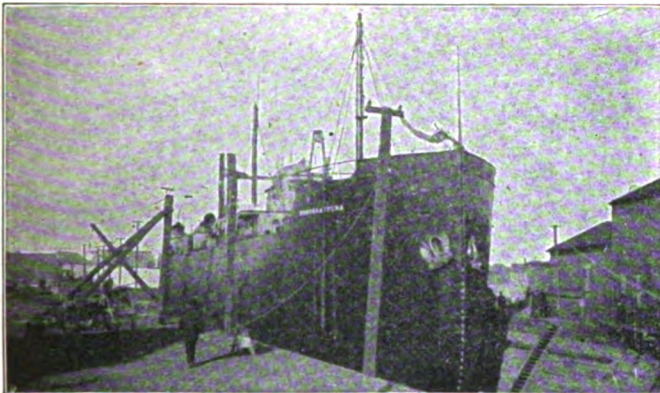
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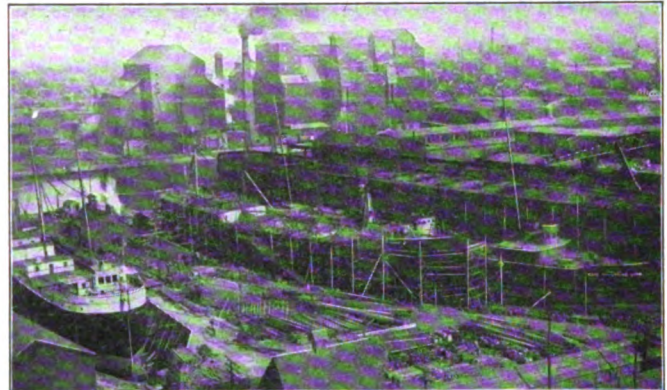
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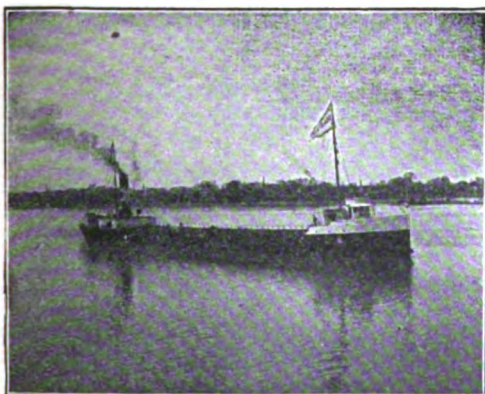
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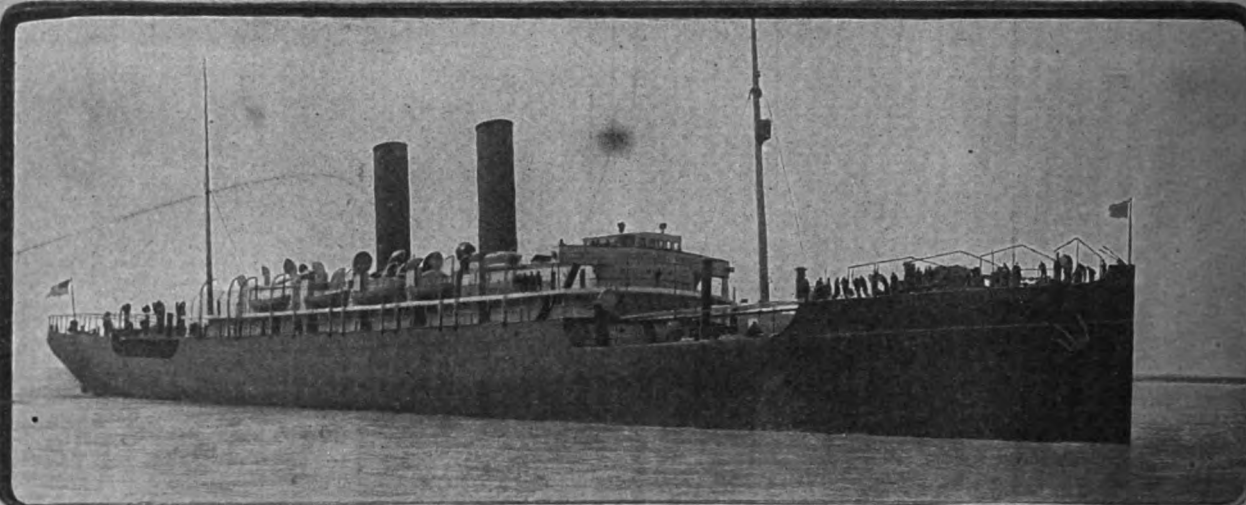
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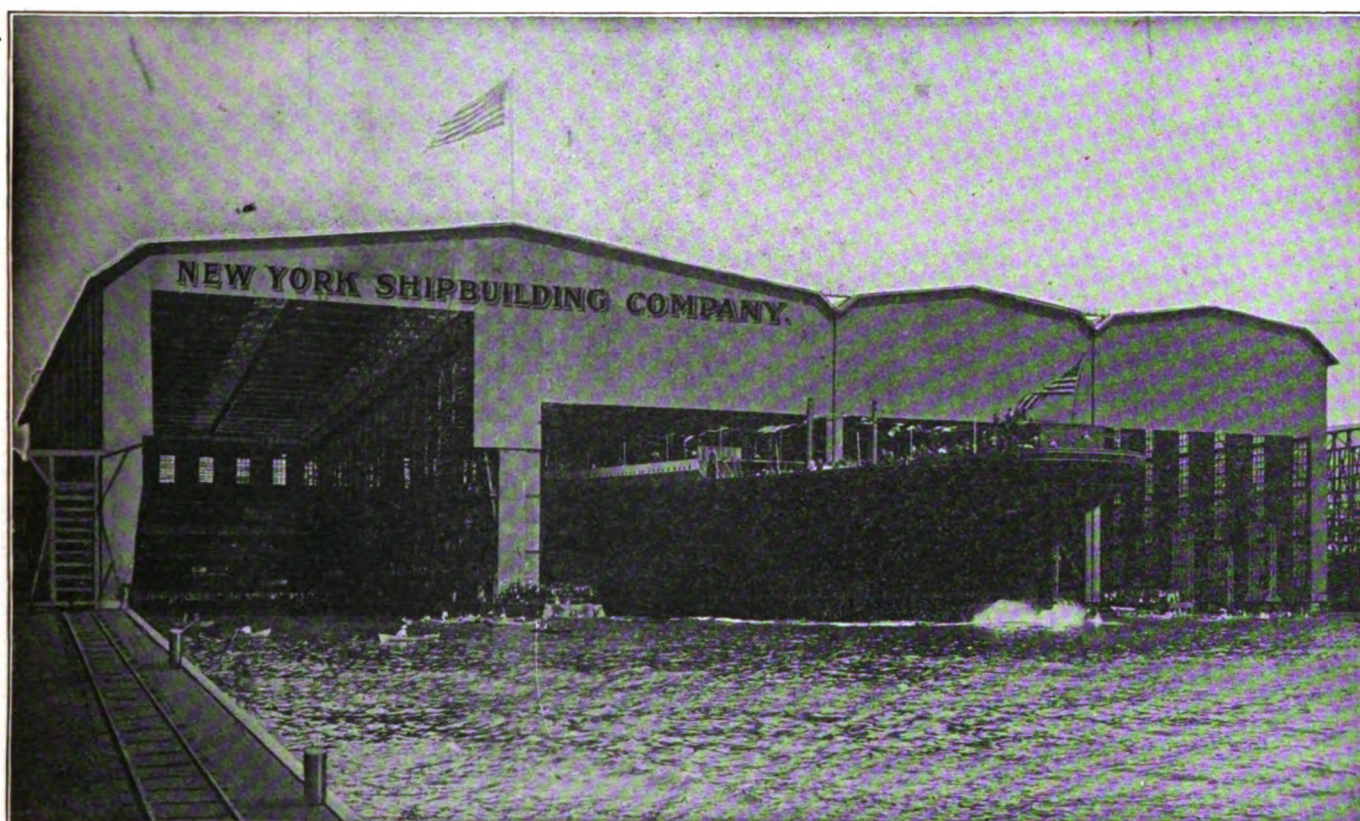
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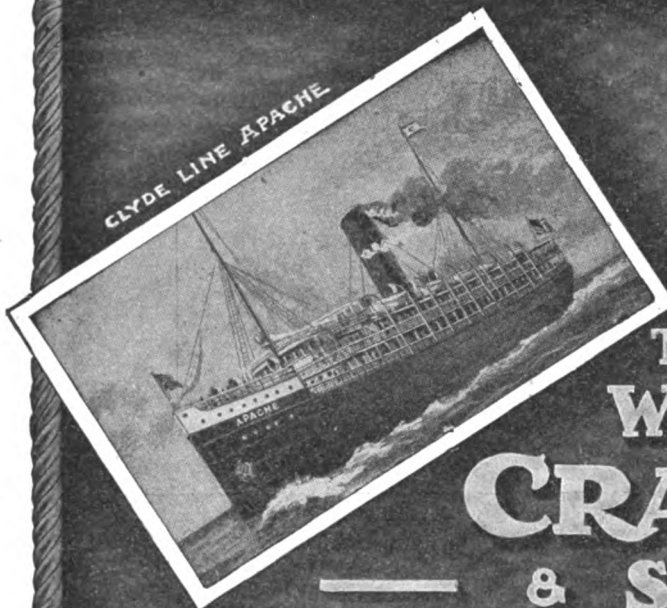
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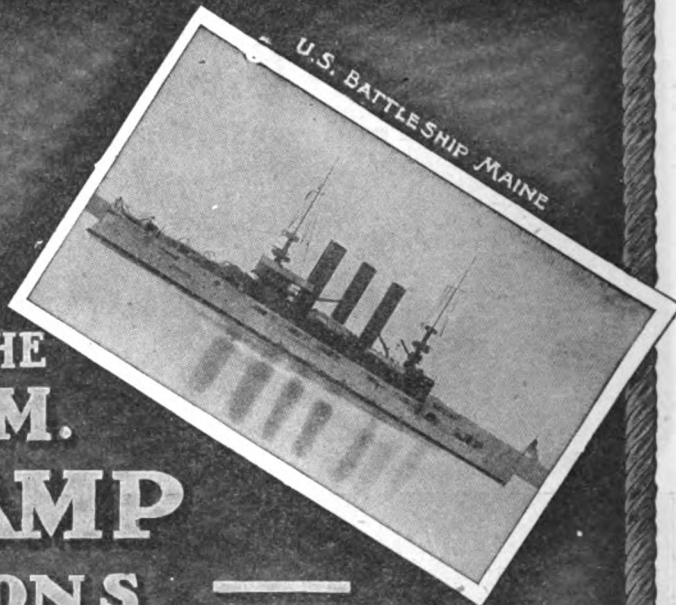
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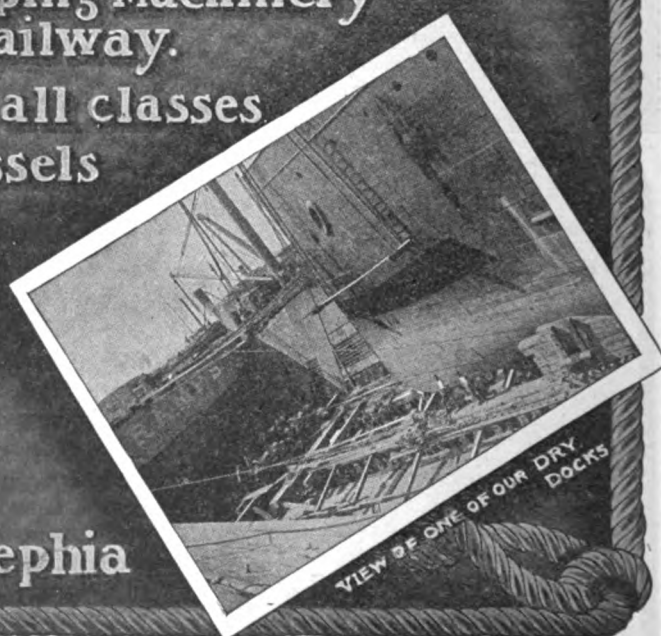
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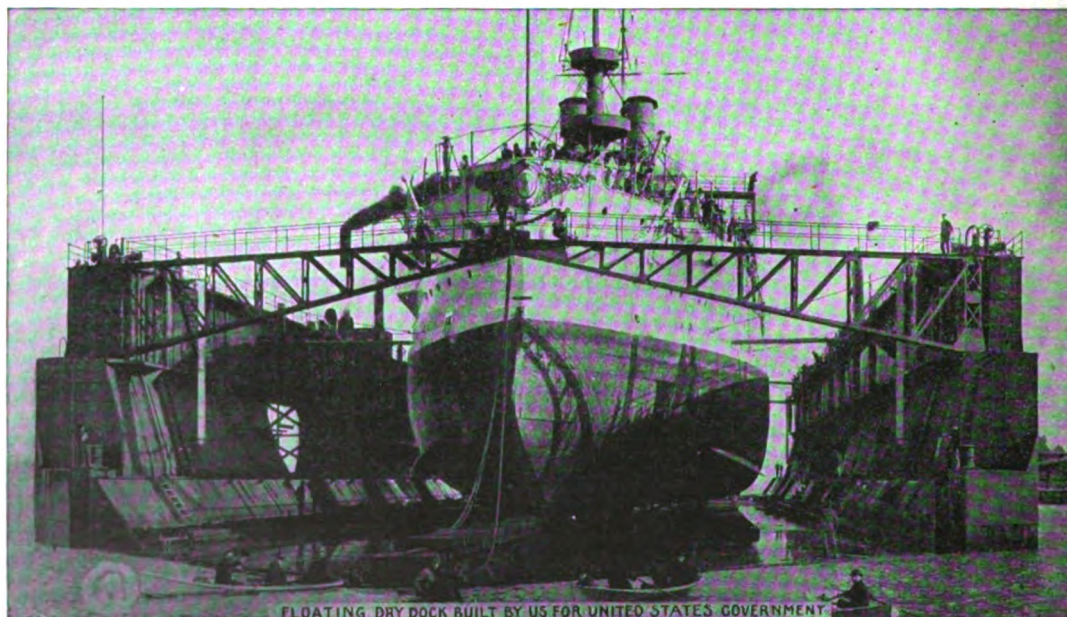
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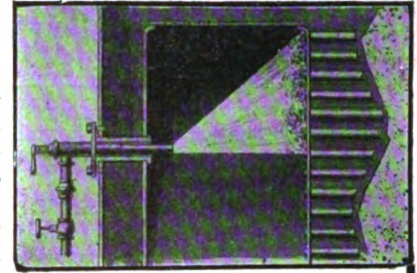
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Place a Diamond Flue Blower on your boiler for a full month. Note how it works with the natural draft from the rear of the boiler—how thoroughly the tubes are cleaned. Note also the simple twist of the handle to operate and the time saved at each cleaning. Observe the saving in fuel and labor in 30 days; then if you can't see economy in a Diamond Blower, send it back. But we know you'll want to keep it.



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THE MARINE REVIEW  
CLEVELAND



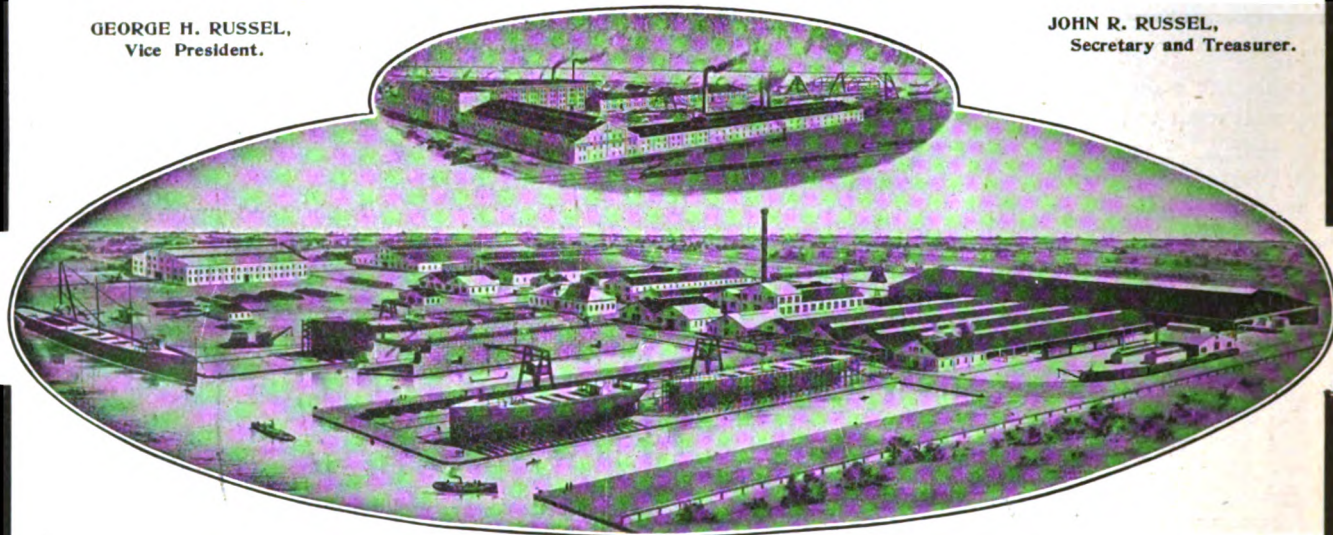
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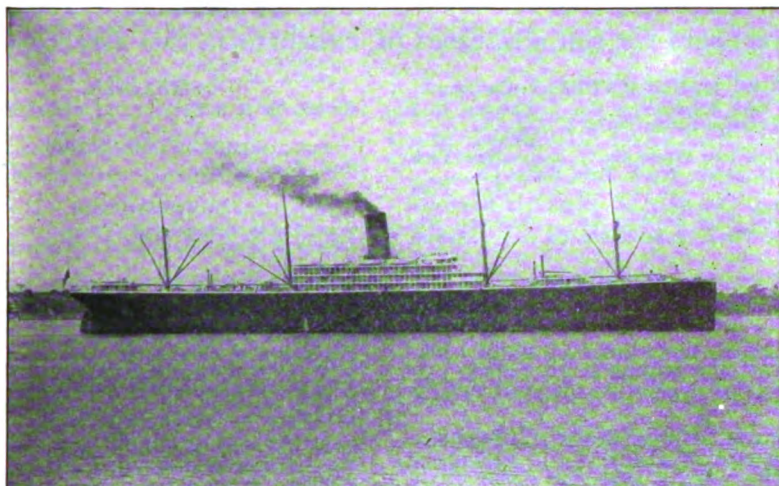
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# Buyers' Directory of the Marine Trade

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

## AIR COMPRESSORS, AIR HOISTS, ETC.

Great Lakes Engineering Works.....Detroit.  
Mietz, Aug. ....New York.

## AIR PORTS, DEAD LIGHTS, ETC.

Marine Mfg. & Supply Co.....New York.

## AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co., Quincy, Mass.  
Great Lakes Engineering Works.....Detroit.

## ANCHORS.

Bowers, L. M. & Co.....Binghamton, N. Y.

## ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.

## ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Sturtevant, B. F., Co.....Hyde Park, Mass.

## ASH EJECTORS.

Great Lakes Engineering Works.....Detroit.

## ATTORNEYS AND PROCTORS IN ADMIRALTY.

Gilchrist, Albert J.....Cleveland.  
Goulder, Holding & Masten.....Cleveland.  
Hoyt, Dustin & Kelley.....Cleveland.  
Jenkins, Russell & Eichelberger.....Cleveland.  
Kremer, C. E.....Chicago.  
MacDonald, Ray G.....Chicago.  
Shaw, Warren, Cady & Oakes.....Detroit.  
White, Johnson, McCaslin & Cannon Cleveland

## BAROMETERS, MARINE GLASSES, ETC.

Ritchie, E. S. & Sons.....Brookline, Mass.

## BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.  
Cleveland Block Co.....Cleveland.

## BLOWERS.

Power Specialty Co.....Detroit.  
Sturtevant, B. F. Co.....Hyde Park, Mass.

## BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.  
Kahnweiler's Sons, David.....New York.  
Lane & DeGroot.....Long Island City, N. Y.  
Marine Construction & D. D. Co.....  
.....Mariner's Harbor, S. I., N. Y.  
Truscott Boat Mfg. Co.....St. Joseph, Mich.  
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

## BOILER CLEANING DEVICE.

Power Specialty Co.....Detroit.

## BOILER COMPOUNDS.

The Bird-Archer Co.....New York  
Dearborn Drug & Chemical Works.....Chicago.

## BOILER MANUFACTURERS.

Almy Water Tube Boiler Co., Providence, R. I.  
American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Chicago Ship Building Co.....Chicago.  
Cramp, Wm. & Sons.....Philadelphia.  
Dearing Water Tube Boiler Co.....Detroit.  
Detroit Ship Building Co.....Detroit.  
East End Boiler Works.....Detroit.  
Fletcher, W. A. & Co.....Hoboken, N. J.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Great Lakes Engineering Works.....Detroit.  
Kingsford Foundry & Machine Works.....  
.....Oswego, N. Y.  
Marine Iron Works.....Chicago.  
Maryland Steel Co.....Sparrows Point, Md.  
Milwaukee Dry Dock Co.....Milwaukee.  
Mosher Water Tube Boiler Co.....New York.  
Newport News Ship Building Co.....  
.....Newport News, Va.

## BOILER MANUFACTURERS—Continued.

New York Shipbuilding Co.....Camden, N. J.  
Northwestern Steam Boiler & Mfg. Co.....  
.....Duluth, Minn.  
Quintard Iron Works Co.....New York.  
Roberts Safety Water Tube Boiler Co.....  
.....New York.  
Stirling, The Co.....New York.  
Superior Ship Building Co.....Superior, Wis.  
Taylor Water Tube Boiler Co.....Detroit.

## BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

## BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

## BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons.....Philadelphia.  
Fore River Ship & Engine Co., Quincy, Mass.  
Great Lakes Engineering Works.....Detroit.  
Lunkenheimer Co.....Cincinnati.  
Macbeth Iron Co.....Cleveland.

## BRIDGES, BUILDERS OF.

Cowing, John P.....Cleveland.  
Scherzer Rolling Lift Bridge Co.....Chicago.

## BUCKETS, ORE AND COAL.

Brown Hoisting & Conveying Machine Co.  
.....Cleveland.

## BULKHEAD DOORS, WATERTIGHT.

"Long Arm" System Co.....Cleveland.

## CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

## CANVAS SPECIALTIES.

Baker & Co., H. H.....Buffalo.  
Bunker, E. A.....New York.  
Upson-Walton Co.....Cleveland.

## CAPSTANS.

American Ship Windlass Co., Providence, R. I.  
Hyde Windlass Co.....Bath, Me.  
Marine Mfg. & Supply Co.....New York.

## CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co.....Jersey City, N. J.

## CHAINS.

Woodhouse Chain Works.....Trenton, N. J.

## CHAIN CONVEYORS, HOISTS.

Brown Hoisting Machinery Co. (Inc.).....  
.....Cleveland.  
General Electric Co.....Schenectady, N. Y.

## CHAIN HOISTS.

Boston & Lockport Block Co.....Boston, Mass.

## CHARTS.

Penton Publishing Co.....Cleveland.  
Potter, J. D.....London.

## CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co.....Boston.  
Ritchie, E. S. & Sons.....Brookline, Mass.

## COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co.....Cleveland.  
Ironville Dock & Coal Co.....Toledo, O.  
Pickands, Mather & Co.....Cleveland.  
Pittsburg Coal Co.....Cleveland.

## COAL AND ORE HANDLING MACHINERY.

Brown Hoisting Machinery Co. (Inc.).....  
.....Cleveland.

## COMPASSES.

Ritchie, E. S. & Sons.....Brookline, Mass.

## COMPASS CORRECTORS.

How, Benj. V.....Boston

## CONDENSERS.

Great Lakes Engineering Works.....Detroit.  
Thropp & Sons Co., John E., Trenton, N. J.

## CONTRACTORS FOR PUBLIC WORKS.

Breymann & Bros., G. H.....Toledo.  
Buffalo Dredging Co.....Buffalo.  
Dunbar & Sullivan Dredging Co.....Buffalo.  
Fitz-Simons & Connell Co.....Chicago.  
Great Lakes Dredge & Dock Co.....Chicago.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Hubbell Co., H. W.....Saginaw, Mich.  
Lake Superior Contracting & Dredging Co.,  
.....Duluth, Minn.  
Smith Co., L. P. & J. A.....Cleveland.  
Starke Dredge & Dock Co., C. H., Milwaukee.  
Sullivan, M.....Detroit.

## CORDAGE.

Baker & Co., H. H.....Buffalo.  
Upson-Walton Co.....Cleveland.

## CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.  
Kahnweiler's Sons, D.....New York.

## CRANES, TRAVELING.

Brown Hoisting Machinery Co.....Cleveland.

## DIVING APPARATUS.

Morse, A. J. & Son.....Boston.  
Schrader's Son, Inc., A.....New York.

## DRAFT, MECHANICAL.

Sturtevant Co., B. F.....Hyde Park, Mass.

## DREDGING CONTRACTORS.

Breymann & Bros., G. H.....Toledo.  
Buffalo Dredging Co.....Buffalo.  
Dunbar & Sullivan Dredging Co.....Buffalo.  
Fitz-Simons & Connell Co.....Chicago.  
Great Lakes Dredge & Dock Co.....Chicago.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Hubbell Co., H. W.....Saginaw, Mich.  
Lake Superior Contracting & Dredging Co.,  
.....Duluth, Minn.  
Smith Co., L. P. & J. A.....Cleveland.  
Starke Dredge & Dock Co., C. H., Milwaukee.  
Sullivan, M.....Detroit.

## DREDGING MACHINERY.

Quintard Iron Works Co.....New York.

## DRYING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.

## DRY DOCKS.

American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Buffalo Dry Dock Co.....Buffalo.  
Chicago Ship Building Co.....Chicago.  
Craig Ship Building Co.....Toledo, O.  
Cramp, Wm. & Sons.....Philadelphia.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Lockwood Mfg. Co.....East Boston, Mass.  
Milwaukee Dry Dock Co.....Milwaukee.  
Newport News Ship Building Co.....  
.....Newport News, Va.  
Shipowners Dry Dock Co.....Chicago.  
Superior Ship Building Co.....Superior, Wis.  
Tietjen & Lang Dry Dock Co.....Hoboken, N. J.

## DREDGE BUILDERS.

Manitowoc Dry Dock Co.....Manitowoc, Wis.

## DYNAMOS.

General Electric Co.....Schenectady, N. Y.  
Mietz, Aug.....New York.  
Sturtevant, B. F. & Co.....Hyde Park, Mass.  
Thropp & Sons, John E.....Trenton, N. J.

## ECONOMIZERS, FUEL.

Sturtevant Co., B. F.....Hyde Park, Mass.

## ELECTRIC HOISTS AND CRANES.

General Electric Co.....Schenectady, N. Y.



# WANTED and FOR SALE Department.

## PROPOSALS.

U. S. Engineer Office, Buffalo, N. Y. November 27, 1905.—Sealed proposals for excavation in Black Rock Harbor, Buffalo, N. Y. will be received here until 11 A. M. January 15, 1906, and then opened. Information furnished on application. H. M. Adams, Col. Eng'rs.

## FOR SALE.

### Marine Engine

FOR SALE.—One fore and aft compound marine engine, 27 cylinders, and 50 x 40. Built by the D. D. D. Co. Enquire of THE MONTAGUE IRON WORKS, Montague, Mich.

## FOR SALE.

One combination Clamshell and Dipper Dredge. Machinery for clamshell dredge. A dipper dredge partly burned. Deck scow 112 x 32 x 9. Tug—14 x 16. Several dredge dippers. Three 100-yd. dump scows. Miscellaneous appliances. Office with safe and fixtures, all to be closed out cheap.

### GARKIN, STICKNEY & GRAM.

### Boiler Engine for Sale.

1 20 x 22 H. P. Engine—1 Scotch Boiler 11 ft. long, 102" dia., allowed 110 lbs. steam, with all connections, pumps, etc. Will be sold at a bargain. C. W. KOTCHER, Detroit, Mich.

## WANTED.

### Marine Engineer

WANTED.—At once, Marine Engineer for yacht navigating southern rivers for pleasure. Yacht is equipped with fore and aft compound condensing engine. State salary expected and apply with references to MORRIS SHERMAN MFG. CO., Chattanooga, Tenn.

### Scotch Boiler

WANTED.—A Scotch Marine Boiler allowed not less than 150' steam. Pass U. S. inspection. Shell about 9' diameter and 10' long. Must be in first-class condition or new. Address 109 East 3rd St., Oswego, N. Y.

WANTED.—A small passenger steamer 100 tp, 120 feet long, 25 feet beam, in good condition and speed of not less than 13 or 14 miles. Address, Box 88 MARINE REVIEW, Cleveland, O.

WANTED.—One captain and one engineer on a freight and passenger line, and to take a financial interest in the company. Address Box 91, care of MARINE REVIEW.

WANTED TO BUY.—A tug of approximately 75 gross tons, wood or steel hull, and about 24 x 28 in. engine, high pressure or equal power compound. Address "Tug," THE MARINE REVIEW, Cleveland, O.

## WANTED.

### BOILER WANTED.

Good second-hand boiler, one that has not been used very long and is in good condition, about 9 or 10 ft. long and 4½ or 5 ft. in diameter. Address DORMER BOUTEN-FISH CO., Bayfield, Wisconsin.

### WANTED TO PURCHASE.—

Good steel or wooden vessel of Welland canal size. Must be in good condition and have sufficient power to enable her to tow one vessel varying fifteen hundred tons. Address Box 84, MARINE REVIEW, Cleveland.

## A Gasoline Launch FREE.

A method whereby a boat, any size, can be secured without investing money, and bring the owner good returns. A new, legitimate proposition, which has been tried and found successful. Particulars and details sent upon receipt of \$1.00. No foolish "scheme."

Reference:—Any bank or newspaper in Sturgeon Bay, Wisconsin.

### Sturgeon Bay Advertising Co., Inc.,

Sturgeon Bay, Wisconsin.

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# Buyers' Directory of the Marine Trade.—Continued.

## ELECTRIC LIGHT AND POWER PLANTS.

General Electric Co.....Schenectady, N. Y.  
Mietz, Aug.....New York.  
Sturtevant, B. F. & Co.....Hyde Park, Mass.  
Thropp & Sons, John E.....Trenton, N. J.

## ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Chicago Ship Building Co.....Chicago.  
Chase Machine Co.....Cleveland.  
Cramp, Wm. & Sons.....Philadelphia.  
Craig Ship Building Co.....Toledo, O.  
Detroit Ship Building Co.....Detroit.  
Fletcher, W. & A. Co.....Hoboken, N. J.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Great Lakes Engineering Works.....Detroit, Mich.  
Hall Bros.....Philadelphia.  
Lockwood Mfg. Co.....East Boston, Mass.  
Maryland Steel Co.....Sparrows Point, Md.  
Mietz, Aug.....New York.  
Milwaukee Dry Dock Co.....Milwaukee.  
Mosher, Chas. D.....New York.  
Moulton Steering Engine Co.....New York.  
Newport News Ship Building Co.....Newport News, Va.  
New York Shipbuilding Co.....Camden, N. J.  
Northwestern Steam Boiler & Mfg. Co.....Duluth, Mich.  
Quintard Iron Works Co.....New York.  
Roach's Ship Yard.....Chester, Pa.  
Sheriffs Mfg. Co.....Milwaukee.  
Superior Ship Building Co.....Superior, Wis.  
Thropp, J. E. & Sons Co.....Trenton, N. J.  
Trout, H. C.....Buffalo.

## ENGINE BUILDERS, STEAM.

Sturtevant Co., B. F.....Hyde Park, Mass.

## ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.  
Marine Mfg. Supply Co.....New York.

## ENGINEERING SPECIALTIES AND SUPPLIES.

Kieley & Mueller.....New York.  
Lunkenheimer Co.....Cincinnati.  
Northwestern Steam Boiler & Mfg. Co.....Duluth, Minn.

## ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander.....Cleveland.  
Hunt, Robt. W. & Co.....Chicago.  
Kidd, Joseph.....Duluth, Minn.  
Mosher, Chas. D.....New York.  
Nacey, James.....Cleveland.  
Roelker, H. B.....New York.  
Wood, W. J.....Chicago.

## FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Hyde Park, Mass.

## FEED WATER PURIFIERS AND HEATERS.

Greacen-Derby Engineering Co.....Perth Amboy, N. J.  
Ross Valve Co.....Troy, N. Y.

## FIRE EXTINGUISHERS.

Safety Fire Extinguisher Co.....New York.

## FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.

## FORGES.

Sturtevant, B. F. Co.....Boston.  
Sutton Co., C. E.....Toledo, O.

## FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Macbeth Iron Co.....Cleveland.

## FLUE WELDING.

Fix's, S. Sons.....Cleveland.

## FUEL ECONOMIZERS.

Sturtevant Co., B. F.....Hyde Park, Mass.

## FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.  
Ironville Dock & Coal Co.....Toledo, O.  
Parker Bros. Co., Ltd.....Detroit.  
Pickands, Mather & Co.....Cleveland.  
Pittsburg Coal Co.....Cleveland.  
Smith, Stanley B., & Co.....Detroit.  
Smith Coal & Dock Co., Stanley B. Toledo, O.

## FURNACES FOR BOILERS.

Continental Iron Works.....New York.

## GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

## GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

## GAUGES, STEAM AND VACUUM.

Ashton Valve Co.....Boston.  
Lunkenheimer Co.....Cincinnati.

## GAUGES, WATER.

Bonner Co., Wm. T.....Boston.  
Lunkenheimer Co.....Cincinnati, O.

## GENERATING SETS.

Sturtevant Co., B. F.....Hyde Park, Mass.  
General Electric Co.....Schenectady, N. Y.

## GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

## GREASE EXTRACTORS.

Greacen-Derby Engineering Co.....Perth Amboy, N. J.

## HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

## HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.  
Sutton Co., C. E.....Toledo, O.

## HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.  
Brown Hoisting Machinery Co. (Inc.).....Cleveland.  
Chase Machine Co.....Cleveland.  
General Electric Co.....New York.  
Georgian Bay Engineering Works.....Midland, Ont.  
Hyde Windlass Co.....Bath, Me.  
McMyler Mfg. Co.....Cleveland.  
Marine Iron Co.....Bay City.  
Mietz, Aug.....New York.

## HOLLOW SHAFTINGS, IRON OR STEEL.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

## HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

## HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

## HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

## ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.  
Roelker, H. B.....New York.

## INDICATORS FOR STEAM ENGINES.

Ashton Valve Co.....Boston.

## INJECTORS.

American Injector Co.....Detroit.  
Jenkins Bros.....New York.  
Lunkenheimer Co.....Cincinnati.  
Penberthy Injector Co.....Detroit, Mich.

## INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.  
Fleming & Co., E. J.....Chicago.  
Gilchrist & Co., C. P.....Cleveland.  
Hawgood & Co., W. A.....Cleveland.  
Helm & Co., D. T.....Duluth.  
Hutchinson & Co.....Cleveland.  
McCarthy, T. R.....Montreal.  
McCurdy, Geo. L.....Chicago.  
Mitchell & Co.....Cleveland.  
Parker Bros. Co., Ltd.....Detroit.  
Peck, Chas. E. & W. F.....New York & Chicago.  
Prindiville & Co.....Chicago.  
Richardson, W. C.....Cleveland.  
Sullivan, D. & Co.....Chicago.

## IRON CASTINGS.

Sutton Co., C. E.....Toledo, O.

## IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland, O.  
Hanna, M. A. & Co.....Cleveland.  
Pickands, Mather & Co.....Cleveland.

## LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Iron Works.....Chicago.  
Truscott Boat Mfg. Co.....St. Joseph, Mich.

## LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.  
Drein, Thos. & Son.....Wilmington, Del.  
Kahnweiler's Sons, D.....New York.

## LIGHTS, SIDE AND SIGNAL.

Russell & Watson.....Buffalo.

## LOGS.

Nicholson Ship Log Co.....Cleveland.  
Walker & Sons, Thomas.....Birmingham, Eng.  
Also Ship Chandlers.

## LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

## LUBRICATORS.

Lunkenheimer Co.....Cincinnati

## LUMBER.

Martin-Barriss Co.....Cleveland.  
Rayner, J.....Chicago.

## MACHINISTS.

Chase Machine Co.....Cleveland.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Lockwood Mfg. Co.....East Boston, Mass.

## MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

## MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

## MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. I.....East Boston, Mass.

## MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.

## MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Sturtevant, B. F. Co.....Hyde Park, Mass.

## METALLIC PACKING.

Katzenstein, L. & Co.....New York.

## MOTORS, GENERATORS—ELECTRIC.

General Electric Co.....Schenectady, N. Y.  
Sturtevant, B. F. Co.....Hyde Park, Mass.

## NAUTICAL INSTRUMENTS.

Benjamin Farnum How.....Boston.  
Ritchie, E. S., & Sons.....Brookline, Mass.

## NAVAL ARCHITECTS.

Hynd, Alexander.....Cleveland.  
Kidd, Joseph.....Duluth, Minn.  
Mosher, Chas. D.....New York.  
Nacey, James.....Cleveland.  
Wood, W. J.....Chicago.

## OAKUM.

Stratford, Oakum Co.....Jersey City, N. J.

## OIL ENGINES.

Mietz, Aug.....New York.

## OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.  
Standard Oil Co.....Cleveland.

## PACKING.

Jenkins Bros.....New York.  
Katzenstein, L. & Co.....New York.

## PAINTS.

Baker, Howard H. & Co.....Buffalo.  
Upson-Walton Co.....Cleveland.

## PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.



# Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

AZIMUTH TABLES BETWEEN PARALLELS OF LATITUDE 30° AND 60° INCLUSIVE—Burdwood.....	\$2 00	NAVAL ARCHITECTURE—W. J. Lovett. Practical, Laying-Off, Theoretical. (Just out, 1905.).....	\$2 50
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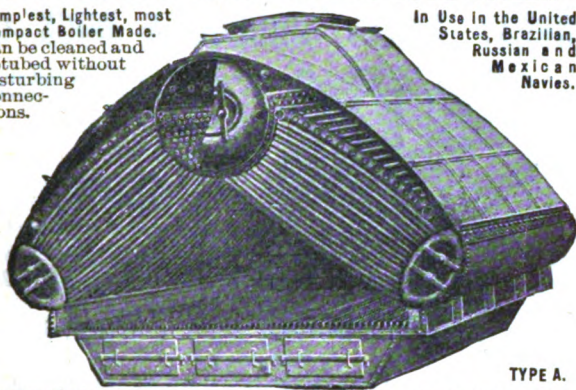
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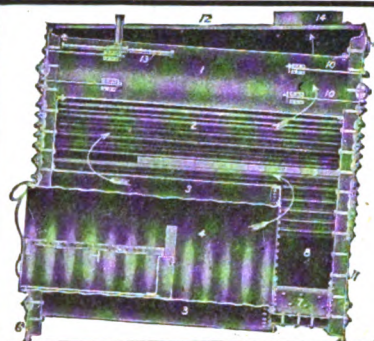
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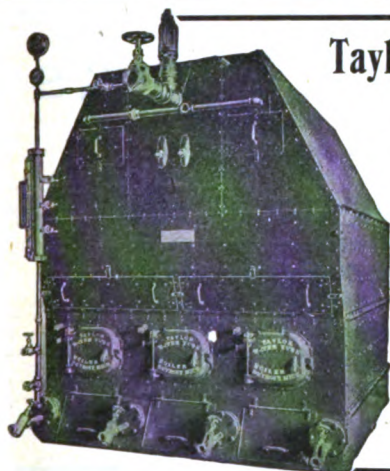
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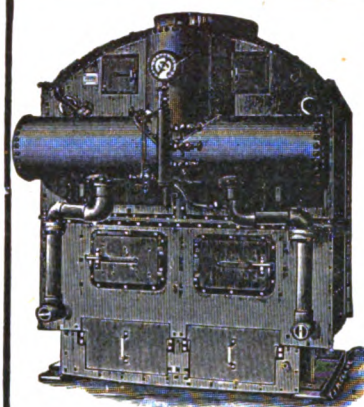
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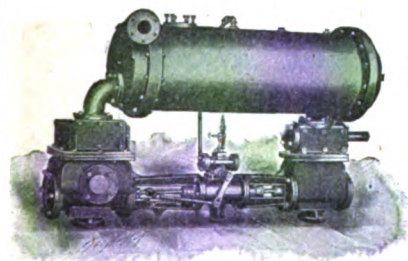
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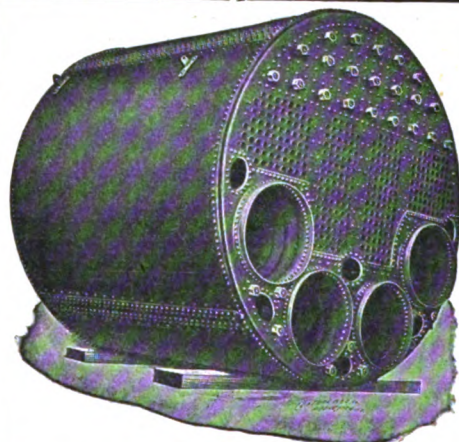
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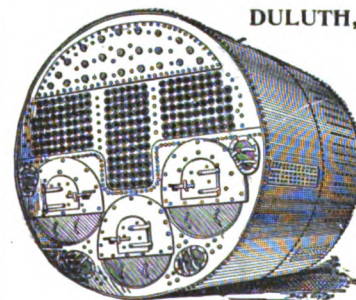
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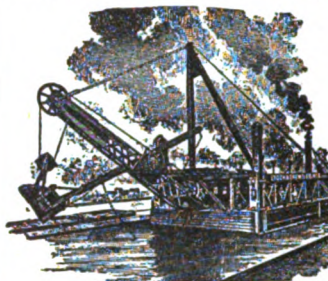
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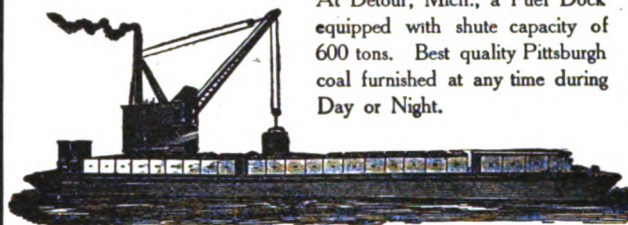
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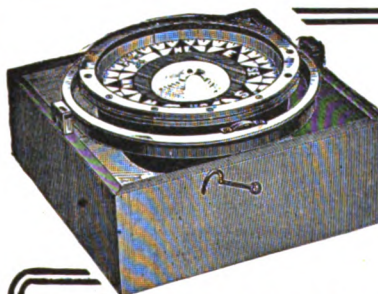
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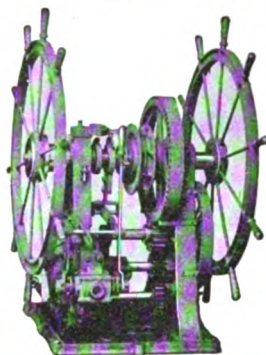
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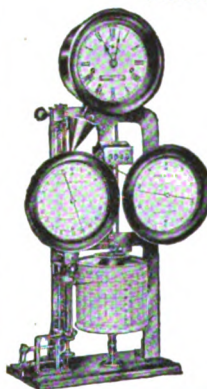
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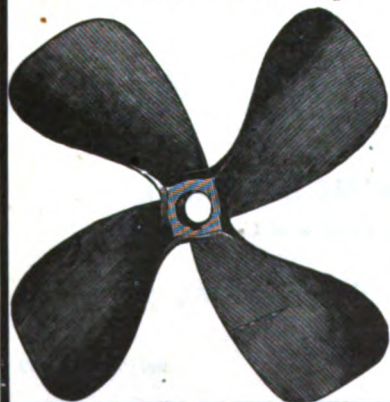


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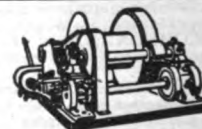
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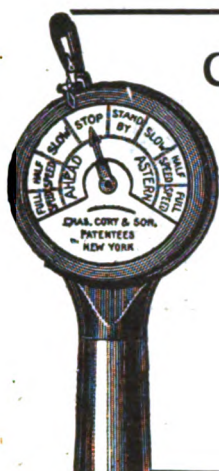
**Lyman C. Smith**  
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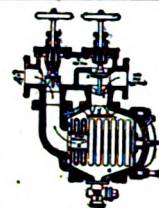
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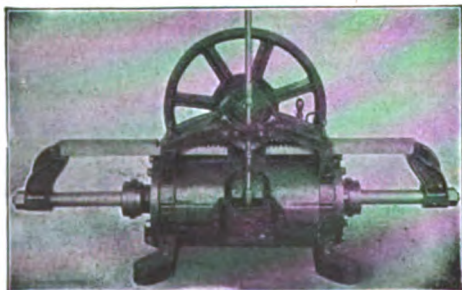
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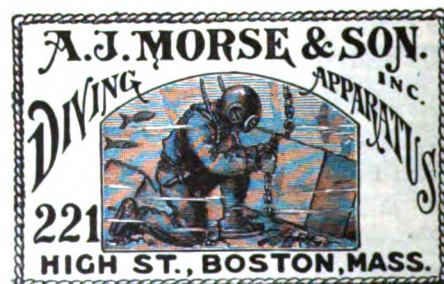
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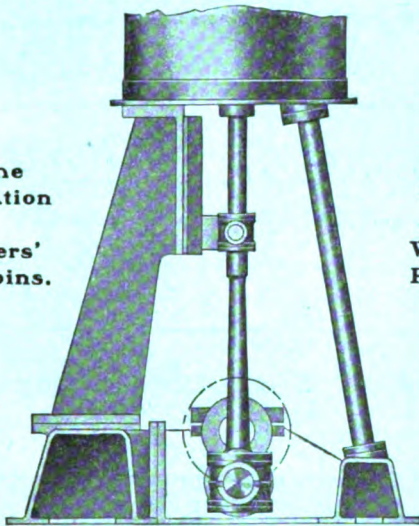




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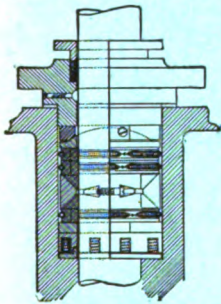
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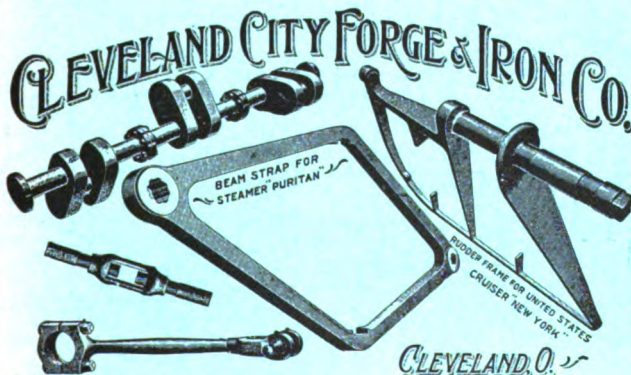
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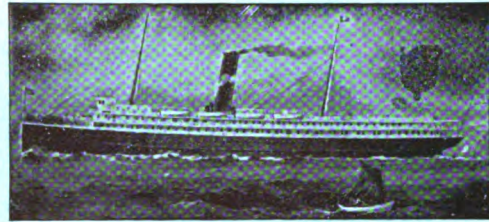
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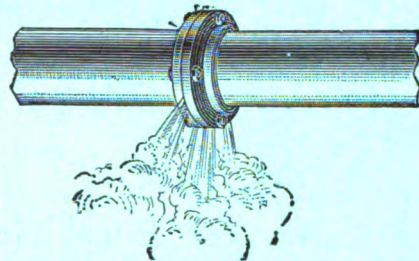
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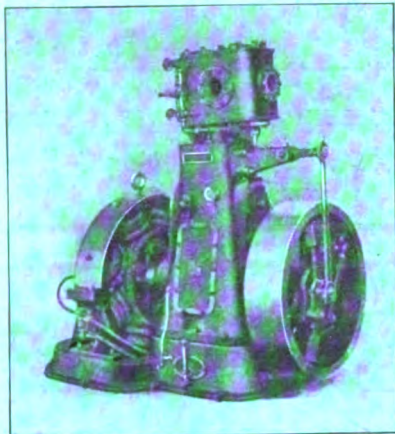
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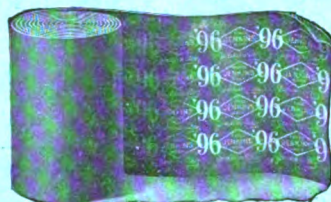
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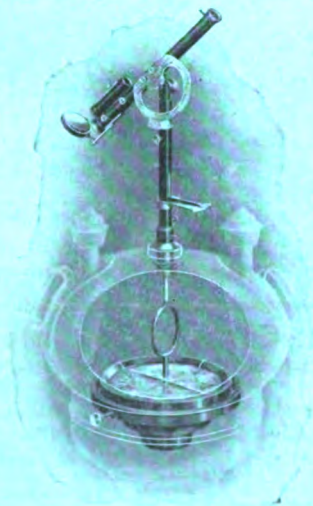
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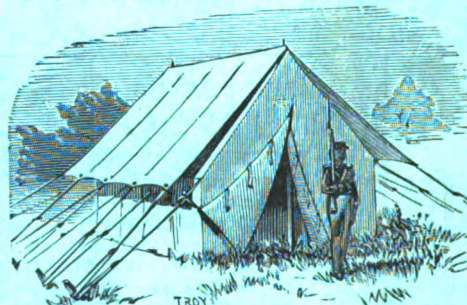
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